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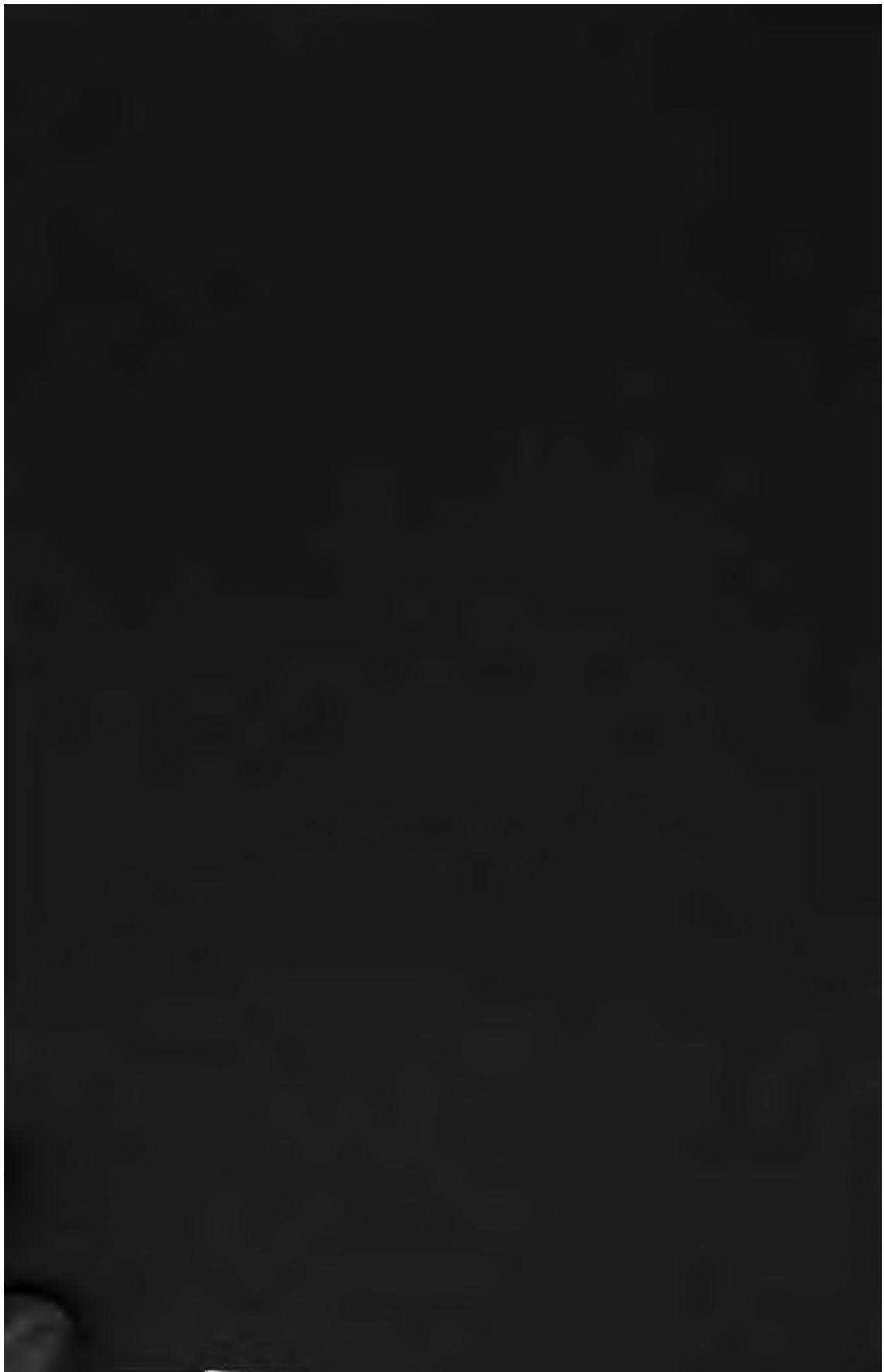


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PLATE I



Xeroderma Pigmentosum.

(From a Painting in oil)

A PRACTICAL TREATISE
ON
*J. C. Blair M.D.
San Antonio, Cal.*
DISEASES OF THE SKIN

FOR THE USE OF
STUDENTS AND PRACTITIONERS

BY
OLIVER S. ORMSBY, M.D.

PROFESSOR AND HEAD OF THE DEPARTMENT OF SKIN AND VENEREAL DISEASES, RUSH MEDICAL COLLEGE (IN
AFFILIATION WITH THE UNIVERSITY OF CHICAGO); DERMATOLOGIST TO THE PRESBYTERIAN, CHILDREN'S
MEMORIAL, SAINT ANTHONY'S, AND WEST SUBURBAN HOSPITALS, THE HOME FOR DESTITUTE
CRIPPLED CHILDREN, AND THE ORPHAN ASYLUM OF THE CITY OF CHICAGO; MEMBER OF
THE AMERICAN DERMATOLOGICAL ASSOCIATION AND OF THE CONGRESS OF
AMERICAN PHYSICIANS AND SURGEONS

ILLUSTRATED WITH 303 ENGRAVINGS AND 39 PLATES IN
COLORS AND MONOCHROME



LEA & FEBIGER
PHILADELPHIA AND NEW YORK
1915

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PREFACE.

It has been the aim of the author in this volume to present the subject of cutaneous diseases in sufficient detail to be of value to the student and practitioner of medicine wishing information in this department. The work has been made as concise as possible, yet is of sufficient scope to cover the field, including the important advances made during the past few years. In the preparation of the work the author has freely used parts of the treatise of his illustrious colleagues, the late Drs. James Nevins Hyde and Frank Hugh Montgomery, for all of which he desires to express his deep appreciation.

Many well-defined new diseases have recently been differentiated, and new facts concerning the nature and course of those previously recognized have been discovered by investigators in various parts of the world. All advances have been duly noted. Dermatological literature has been carefully reviewed in order that the pages of this treatise may reflect its subject as completely as the limits of a single volume permit. The newer methods of diagnosis and treatment of proved value are incorporated, together with the results of research in etiology and pathology. Opinions of experienced dermatologists are freely quoted. The appended references are sufficient to give the inquiring student a guide to the most instructive literature of any particular subject.

Many illustrations are reproduced from Dr. Hyde's treatise, and a large number of new ones have been added from the author's own collection, as well as through generous contributions of his colleagues. The author is deeply grateful to Drs. John A. Fordyce and George M. MacKee for placing at his disposal their excellent photographs, a number of which have been employed. He is further indebted to Drs. Howard Morrow, Otto H. Foerster, J. F. Siler, W. J. MacNeal and Fred Wise for photographs kindly furnished, and his thanks are due to the following gentlemen for the privilege of reproducing those heretofore used: Drs. John A. Fordyce, George Henry Fox, Howard Fox, A. D. Mewborn, Douglass W. Montgomery, Howard Morrow, Ernest E. Tyzzer, Stopford Taylor, M. L. Heidingsfeld, David Lieberthal, Ernest L. McEwen and Heman Spalding.

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For valuable assistance in abstracting the foreign literature, for the chapter on Hemorrhages, and for work incident to proof-reading, the author is greatly indebted to Dr. James Herbert Mitchell; and to his associate, Dr. J. Frank Waugh, for the chapter on the Wassermann Technique, and other assistance during the development of the work.

He further desires to express to the publishers, Messrs. Lea & Febiger, his appreciation for encouragement during the preparation of the work and for the uniform courtesy extended while the pages were passing through the press.

O. S. O.

CHICAGO, ILL., 1915.

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ABBREVIATIONS EMPLOYED IN THE WORK.

- Annales: Annales de Dermatologie et de Syphiligraphie, Paris.
Archiv: Archiv für Dermatologie und Syphilis, 1869-73; and since 1889.
Brit. Jour. Derm.: British Journal of Dermatology, London.
Brit. Med. Jour.: British Medical Journal, London.
Centralb.: Dermatologisches Centralblatt, Leipzig.
Giorn. ital.: Giornale italiano delle malattie veneree e della pelle, Milan.
Jour. Amer. Med. Assoc.: Journal of the American Medical Association, Chicago.
Jour. Cut. Dis.: Journal of Cutaneous and Venereal Diseases, 1882-87; Journal of Cutaneous and Genito-Urinary Diseases, 1888-1902; Journal of Cutaneous Diseases, including Syphilis, since 1903, New York.
Jour. mal. cutan.: Journal des maladies cutanées et syphilitiques, Paris.
Monatshefte: Monatshefte für praktische Dermatologie, Hamburg.
Vierteljahr.: Vierteljahresschrift für Dermatologie und Syphilis, 1874-88.
Zeitschrift: Dermatologische Zeitschrift, Berlin.
Allbutt and Rolleston's System: A System of Medicine by Many Writers, edited by T. C. Allbutt and H. D. Rolleston. MacMillan & Co., London, 1911.
American Text-book: An American Text-book of Genito-Urinary Diseases, Syphilis, and Diseases of the Skin, edited by L. Bolton Bangs and W. A. Hardaway, Philadelphia.
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Internat. Atlas: The International Atlas of Rare Diseases of the Skin.
Jarisch, Die Hautkrankheiten: Die Hautkrankheiten, Nothnagel's Specielle Pathologie und Therapie XXIV, Vienna, 1900 u. 1901.
Kaposi, Diseases of the Skin: Pathologie und Therapie der Hautkrankheiten, ninth edition, 1899.
La Pratique Dermatologique: La Pratique Dermatologique, Traité de Dermatologie appliquée, edited by E. Besnier, L. Brocq, and L. Jacquet, Paris, 1900-1902.
MacLeod, Pathology: Practical Handbook of the Pathology of the Skin, by J. M. H. MacLeod, London and Philadelphia, 1903.
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Scheube, Diseases of Warm Countries: Diseases of Warm Countries, by B. Scheube, translated by Pauline Falcke, edited by James Cantlie, Philadelphia, 1903.
Stelwagon, Diseases of the Skin: Treatise on Diseases of the Skin, Henry W. Stelwagon, Philadelphia and London, 1913.
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Unna, Histopathology: The Histopathology of the Skin, P. G. Unna; English translation by Norman Walker, Edinburgh and New York, 1896.

INTRODUCTION.

PRECEDING the description of the various diseases of the skin, several chapters are devoted to subjects of vital interest to the student of dermatology, and which, if mastered, will materially simplify the study of the individual diseases. Without a good working knowledge of the microscopic anatomy and of the physiology of the skin, an understanding of the pathological changes which occur in disease is rendered more difficult. In the description of cutaneous diseases in the text, the different symptoms are described in terms entirely different from those used ordinarily, and the student is therefore urged to master the chapter devoted to General Symptomatology. In the chapter on General Pathology, many terms are defined and pathological processes common to a large number of diseases are outlined which greatly facilitate the special study taken up later. In the chapter on General Diagnosis, special methods pertaining to cutaneous disease are detailed, such as the Wassermann test for syphilis, Noguchi's luetin test for syphilis, and the tuberculin, von Pirquet, and other tests for tuberculosis, in addition to much other information of value in the general and special examination of the patient. The chapters on General Etiology and Prognosis should also receive attention, and the one devoted to General Treatment is of value both for reference on special occasions, and also to obtain some knowledge of drugs, chemicals, and other means found useful in the management of cutaneous diseases. Among other methods described here will be found radiotherapy, which includes *x*-rays and radium; phototherapy, vaccine therapy, and the technique for treatment with liquid air and solidified carbon dioxide.

I. ANATOMY AND PHYSIOLOGY OF THE SKIN.

THE skin is essentially one of the vital organs of the body, performing functions necessary to health and life. It is closely associated with underlying structures, and by its situation is brought into intimate relation with the external world. The skin is a complex, elastic, and sensitive organ, varying greatly in different conditions of climate,

age, sex, health, and race; and varying also in the characteristics exhibited in different localities upon the same individual. Thus, in color there is a wide range between the fair skin of the blonde and the black skin of the negro, between the rosy pink of the infant's palm and the dark-brown hue of the genital region of the aged. The skin varies also in pliability and thickness, being delicate and lax over the eyelids, the lips, and the prepuce, and much thicker and more firmly attached over the palms and soles.

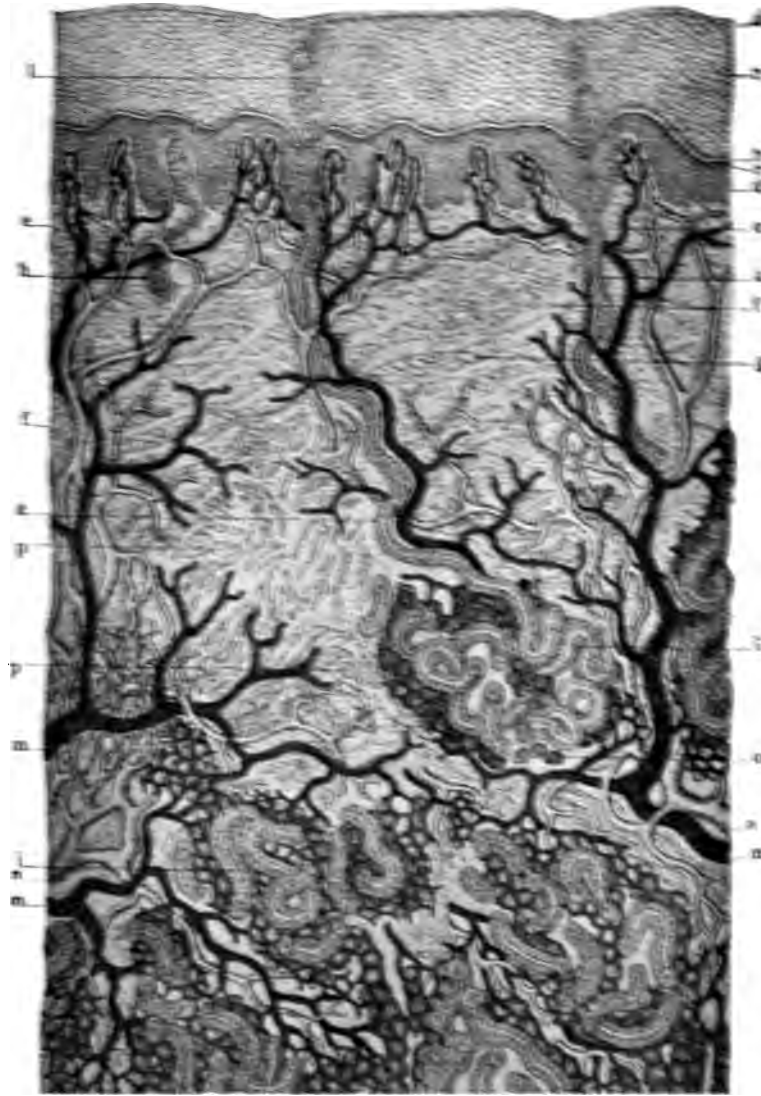
Ridges and Furrows.—Viewed externally, the skin is seen to be traversed by superficial and deep furrows, which vary in arrangement and size according to their situation. They are formed by the attachment of the skin to the deeper structures, by the movement to which one part is subjected, and by the arrangement of the fibrous structures of the corium. In some situations (the palms and soles), the fine furrows have a regular arrangement and run parallel with each other. The pattern thus outlined is constant in the individual, of which fact use is made in the identification of criminals. Between these fine furrows are ridges dotted with numerous depressions representing the openings of sweat-pores. The entire body is traversed by fine furrows, which form an irregularly diamond-shaped network.

Coarse furrows are found chiefly in situations where the skin is subjected to movement, such as about the joints, and they are due to the fixation of the skin to deeper structures by fibrous bundles. It is in such situations that fissures occur, when the normal pliability is lost through inflammatory thickening. The shape of many of the lesions of the skin is determined by the ridges and furrows above described.

The skin is divided, on account of anatomical differences, into three general layers: the epidermis or cuticle; corium or true skin; and subcutaneous tissue or hypoderm. In these various layers are found the coil- and sebaceous-glands, blood-vessels, lymph-vessels, muscles, pigment, nerves, and the appendages of the skin—the hairs and nails. A clear conception is best had in a study of these component parts by progressing from within outward.

Subcutaneous Tissue (*Stratum Subcutaneum*, *Panniculus Adiposus*).—The subcutaneous tissue, or hypoderm, is differentiated from the corium between the third and fourth months of fetal life. It is a structure serving a mechanical purpose as a receptacle for fat, and for the support of vessels and nerves passing from the tissues beneath to the corium above. It contains, also, coil-glands, some of the hair-follicles more deeply situated than their fellows, and Pacinian corpuscles. There is no distinct boundary line between the upper limits of the subcutaneous tissue and the overlying corium, to which it projects columnar masses of fat, extending obliquely to the coil-glands and the hair-follicles above, often with lateral, horizontally disposed prolongations of similar shape. It is built up of loose connective-tissue bundles, which are attached to the aponeuroses, fasciæ, and the membranes lying beneath.

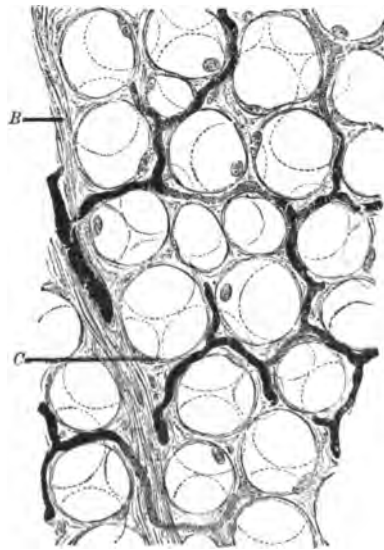
FIG. 1



Section of skin from the palm of the hand, magnified 150 diameters. *a*, stratum corneum, *a'*, its superficial layer; *b*, stratum lucidum; *c*, stratum granulosum; *d*, stratum nucleosum rete; *e*, pars papillaris of the corium, loops of capillary vessels showing in vascular papillae; *f*, pars reticularis of the corium, showing coarse interlacing connective-tissue bundles; *g*, transverse section of the latter; *h*, double-contoured nerve-fibers passing to tactile body; *i*, coil-glands; *j*, ducts of coil-glands; *k*, sweat-pores passing to surface of the epidermis; *m*, arteries of the skin terminating in capillaries; *n*, veins of the skin forming plexuses; *o*, fat-cells, encompassed by capillary loops, in relation with coil-glands (the capillaries of the latter are purposely omitted in the drawing); *p*, obliquely and transversely divided bundles of connective-tissue fibers of the corium and subcutaneous tissue.

The subcutaneous tissue is attached firmly to the skin over the extensor surfaces of the articulations, the palms and soles, and the groins by short, coarse bundles, between which are single or multilocular spaces lined with endothelia secreting a mucoid fluid. Some of these are congenital; others result from evolution later in life. They are most frequent and largest where necessary movements occur, as where the skin is stretched over a bone or tendon. These spaces constitute the *bursæ mucosæ*. In the eyelids, the penis, the scrotum, and the auricle of the ear, the attachment to the skin is by loose, delicate connective tissue, containing no fat-globules. In other situations, the fibrous tracts are arranged obliquely. They admit by their extension of various degrees of pliability, and inclose

FIG. 2



Subcutaneous fat-tissue, the fat having been extracted with turpentine: *B*, bundles of fibrous connective tissue, carrying injected blood-vessels; *C*, capsules of fat-globules, with oblong nuclei. Magnified 500 diameters. (After Heitzmann.)

rhomboidal spaces containing more or less numerous fat-globules. These spaces are divided into lobes by fibrous tissue called *trabeculæ*, and the lobes are again subdivided by fibrous septa into lobules. In addition to these collections of fat, columns extending obliquely from this situation to the bases of hair-follicles and coil-glands have been described by Warren.¹ They are known as *columnæ adiposæ*.

The deposit of fat in the body is reduced greatly in all diseases productive of emaciation, but never wholly disappears during life. In cases of obesity, fat is deposited in excess of normal limits, and it may then be concerned in the production or the aggravation of disease.

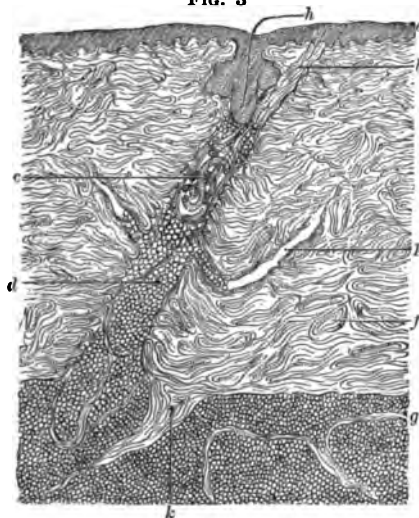
¹ Boston Med. and Surg. Jour., April, 1877.

It is due largely to the greater or lesser volume of the panniculus adiposus that the natural outlines of the body are made to the eye graceful and attractive or the reverse.

The Corium (*Derma, Cutis, Cutis Vera, or True Skin*).—The corium is a mesoblastic structure, made up largely of connective tissue and cellular elements. It is rich in blood-vessels and capillaries, especially in the papillary layer, and contains many nerves, nerve-endings, and terminal nerve organs. It also contains lymphatics, small muscle-fibers, hairs, sweat-glands, and sebaceous-glands.

The fibrous elements are of two varieties: collagen and elastin. The collagen occurs as bundles of fibers held together by a semifluid, interfibrillary substance. The fibers are about $\frac{1}{3200}$ of an inch

FIG. 3



Vertical section of the skin showing: a, epidermis; b, erector pili muscle; d, columnæ adiposæ; c, coil-gland suspended in the columnæ adiposæ; h, sebaceous gland; p, horizontal prolongations of the column; f, fibrous bundles of the corium; g, panniculus adiposus; k, band of fibrous tissue extending into the panniculus adiposus. (After Warren.)

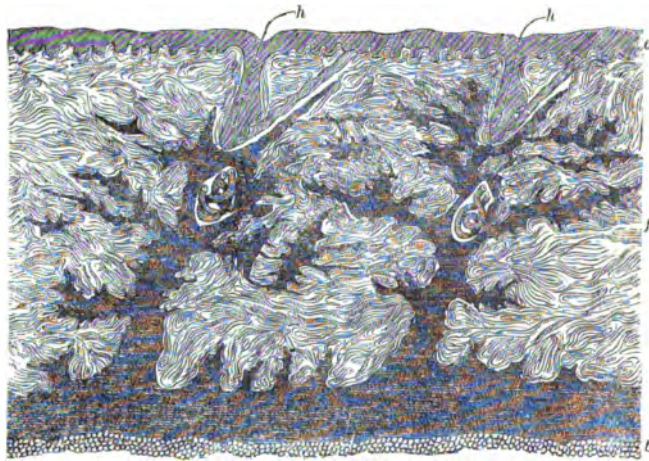
(0.79μ) in breadth, and according to Clarkson (quoted from MacLeod) are made up of fibrils that are approximately $\frac{1}{50000}$ to $\frac{1}{20000}$ of an inch (0.05μ to 0.12μ) thick. The collagenous bundles are only slightly extensible, but as their arrangement presents a wavy appearance, on longitudinal section, they admit of stretching of the skin. The individual fibers do not branch, but such an appearance is simulated by the joining of parts of different bundles.

The elastic fibers (elastin) occupy the entire corium and extend throughout the subcutaneous tissue. These fibers, by anastomatic branches, form a network which surrounds the collagenous bundles and all the other elements of this region, acting as a supporting framework. These fibers vary in thickness from imperceptible fineness up

to 11μ in breadth (Stöhr) and have little elasticity. They are the first to rupture when the skin is stretched, as is demonstrated in the *lineæ albicantes*, and their chief function appears to be that of support.

The cellular elements of the corium consist of connective-tissue corpuscles, vacuolated cells (Schäfer), mast-cells, and migratory blood-cells. (Description of these cells, p. 74.) The fibers and bundles of connective tissue are coarsest toward the subcutaneous tissue, and finest toward the outermost portion, which comes in contact with the epidermis above. They form the mesoblastic portion of the hair-follicle, the capsules around the coil-glands, and the layers which surround their ducts.

FIG. 4



Vertical section of skin after injection (from beneath) of areolar tissue with Berlin blue: a, epidermis; f, corium; g, panniculus adiposus; h, sebaceous gland. (After Warren.)

Corresponding with their anatomical structure, the upper and lower portions of the corium are called respectively the "papillary layer" and the "reticular layer." There is no sharp dividing line between these layers, the pars reticularis passing gradually into the pars papillaris above and into the subcutaneous tissue below.

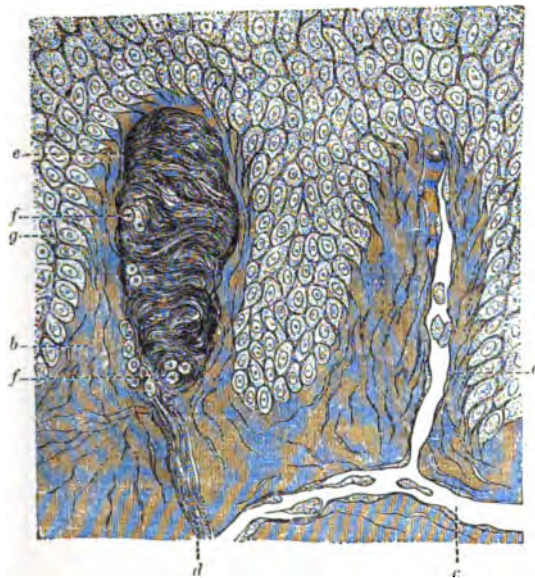
Pars Reticularis.—The reticular layer of the corium is made up of interlacing connective-tissue bundles, which are coarser below and separated by larger spaces. The bundles become finer and the spaces smaller toward the surface.

Pars Papillaris.—The papillary layer lies in contact with the rete above, and is connected below with the deeper reticular portion of the corium. Between the rete and the papillæ of the corium, a hyalin substance is interposed, which is supposed to be identical with the cement substance surrounding and separating the fibrillæ of the corium. The basal membrane, once thought to be stretched between the rete mucosum of the epidermis and the papillary

layer of the corium, cannot be demonstrated to exist. Viewed obliquely with an amplification of about 300 diameters, it will be seen that long, slender filaments from the prickle-cells of the mucous layer of the epidermis encircle in a spiral direction both nervous and vascular papillæ. At the apices of the latter, these threads completely surround the connective-tissue fibers.

The name of this portion of the corium is intended to describe its chief characteristic, the existence of numerous digital prolongations or nipple-like prominences of the corium, made up of delicate connective-tissue fibers, which do not interlace and which are abundantly provided with nuclei. The papillæ spring each from a single, or

FIG. 5



Vascular and nervous papillæ: *a*, vessel; *b*, nervous papilla; *c*, vessel; *d*, nerve-fiber; *e*, corpusculum tactus; *f*, transversely divided nervous filaments; *g*, epithelia of rete. (After Biesiadecki.)

several from a common, ovoid base. Their bulbous, conical, or blunt apices reach into the rete, which also dips down between them in prolongations termed "rete-pegs." The papillæ vary in size in different parts of the body, and also in their disposition and shape, being in places arranged in linear series, and in others in concentric whorls, with definite centres, thus producing corresponding furrows, visible to the naked eye as markings upon the outer surface of the epidermis. The largest are found on the palms and soles and over the inner faces of the digits. It has been estimated that 100 are developed within each square millimeter of the body surface.

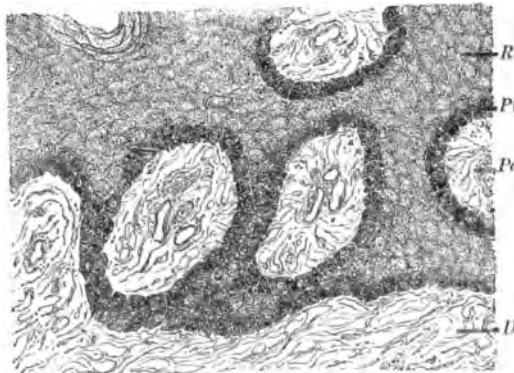
In horizontal sections of the skin, the papillæ, being transversely divided, appear as circular or ovoid areas, in which can be recognized

a centrally and transversely or obliquely divided capillary loop. Between these areas is seen the interpapillary reticulum of the mucous layer.

The growth of the rete downward and of the corium upward results in mutual effects of pressure and counter-pressure, the equilibrium of which is constantly adjusted by the mechanical and vital necessities of such union.

When the papillæ are completely exposed, after removal of the overlying cement substance and of the epidermis above, their exterior surface is seen to be uniformly and delicately marked with series after series of alternating furrows and ridges, more or less concentrically disposed. Into the grooves are admitted corresponding dentations, that can be recognized on the under surface of the layer of epithelial cells next to the corium. They may, however, be the furrows left after separation of the long prickles wrapped about the papillæ and traceable to the mucous layer.

FIG. 6



Scalp of a negro—horizontal section: *R*, rete mucosum; *Pi*, row of columnar epithelia (cut obliquely) supplied with dark-brown pigment-granules; *Pa*, papilla (cut transversely); *D*, derma. Magnified 500 diameters. (After Heitzmann.)

Two varieties of papillæ are distinguished, the vascular and the nervous. The former contains the terminal loops of a minute artery and vein, and the latter the terminations of medullated nerve-fibers.

The greater number of the papillæ are of the vascular variety, being traversed by a vertically disposed loop of vessels, consisting of an arterial and a venous capillary. The office of the vascular loop is evidently not merely to supply nutriment for the epidermis above, but also to provide for the cooling of the blood when brought in large quantities to the surface of the body. Occasionally, two or more of such loops can be recognized in a single papilla.

The nervous papillæ contain the tactile corpuscles, which serve an important purpose in providing for the sensibility of the integument

Ultimate terminations of nerves can be seen in the papillæ largely occupied with the corpuscles of touch.

Lines of Cleavage.—Puncture of the skin with a rounded instrument leaves an irregularly longitudinal slit. This phenomenon occurs as the result of the arrangement of the connective-tissue bundles and fibers of the corium. Dupuytren¹ studied this in the skin of the palm, and Langer and Heitzmann² later mapped out the special directions over the entire body in which these lines occur.

The Epidermis (*Scarf Skin or Cuticle*).—The epidermis is the most external of the several layers of the skin, being in close contact on one side with the corium and exposed on the other to the atmosphere by which it is surrounded. The latter surface is therefore relatively drier, while the former is constantly moistened by fluids from the vessels which ramify beneath it. It is of epiblastic origin and made up of superimposed strata of epithelial cells, and varies in aspect and thickness according to its anatomical situation and the age of the subject.

The epidermis is composed of the following principal layers, named in order from within outward: the stratum mucosum, the stratum granulosum, the stratum lucidum, and the stratum corneum. All the cells composing these various layers are derived from the basal layer of the rete. Besides these, Ranvier and others recognize a stratum germinativum, a stratum filamentosum, a stratum intermedium, and a stratum disjunctum.

Rete Mucosum (*Mucous Layer, Prickle Layer, Stratum Mucosum, Rete Malpighii or Malpighianum*).—This is the deepest of the epidermal layers, and rests upon the corium below. It is generally designated as "the rete." The corium is intimately united with it by a series of interdigitations, which are commonly described as prolongations of the derma into the substance of the rete; but it is equally true that the rete sends down prolongations (the "rete-pegs") into the derma. The two, in the need of an intimate union to resist friction and to insure vascular supply, are thus closely locked together.

The stratum mucosum is built up of nucleated epithelial cells, chiefly of polyhedral shape. These cells are masses of granular protoplasm, living matter, which by their relation to one another form a protoplasmic network enveloping the entire surface of the body and lining all channels and cavities in direct or indirect communication with the surface. There are lymph-spaces between the epithelia, from which the nutritive fluids are conveyed to the cells, and the individual cells are united by delicate protoplasmic threads, called prickles, spines or thorns. The epithelia are not provided with either blood-vessels or lymph-vessels, but are supplied with a large number of nerves, which, in the shape of very minute beaded fibers, traverse the intercellular substance, and which are in direct communication

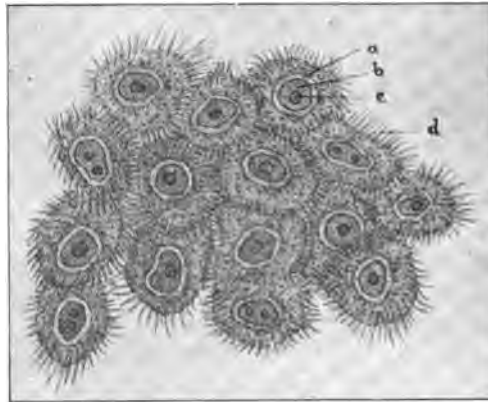
¹ Ueber die Verletzungen durch Kriegswaffen aus der Franz, 1836, p. 27.

² Archiv, 1890, xxii, p. 3.

with the reticulum of living matter within the protoplasmic bodies themselves.

Next to the corium is a layer (*basal layer, stratum germinativum*) of cells, columnar in form, often largely provided with pigment, and arranged with their long axes nearly at right angles to the plane of that portion of the corium upon which they are superimposed. The cells of this layer are dividing constantly by mitosis, the daughter-cells pushing outward to form the succeeding layers. The entire epidermis is thus derived from this single (occasionally double) row of columnar cells. More externally, the cells are rounded or cuboidal in form, with large, distinct nuclei. They are not arranged in definite strata except in the outermost layers, where the cells become more flattened and elongated (*stratum filamentosum*).

FIG. 7



Prickle-cells from a condyloma (magnified about 625 diameters): *a*, cavity of cell-nucleus; *b*, nucleus; *c*, nucleolus; *d*, prickles—these are greatly developed on the protoplasm of the cells. The dots on the surface of the protoplasmic mass represent the appearance of the prickles when directed toward the eye of the observer. Some of the protoplasmic threads are seen passing from one cell to another.

Langerhan's Cells.—These are elongated, irregularly stellate, non-nucleated bodies, found chiefly in the deeper parts of the rete. They have been looked upon as pigment-cells devoid of pigment, as wandering cells, lymphoid cells, and as colorless tissue-corpuscles.

Stratum Granulosum (*Granular Layer*).—The stratum granulosum of the epidermis lies immediately above the stratum mucosum, and is built up of three or four rows of horizontally disposed cells, united to one another by short, broad threads, and containing granules. Between the cells, the spaces are so contracted that nutritive fluids cannot easily filter outward, and the nuclei of the cells are usually shrunken. These cells have been classified and studied by Ranvier, Kölliker, Waldeyer, and others. According to these observers, the roundish granules which give this layer of the epidermis its name and

peculiar appearance consist of keratohyalin, a substance which plays a part in the process of cornification. These granules first appear in the neighborhood of the nuclei of some of the large prickle-cells in the rete, but they are best studied in the granular layer, the cells of which are often completely filled with them. Keratohyalin is a solid or semisolid substance, being chemically closely allied to hyalin. According to Unna, the color of the skin of the white races depends upon this layer alone.

Stratum Lucidum (*Septum Lucidum*) of Oehl lies immediately above the stratum granulosum, and appears under the microscope as a delicate, brightly colored line consisting of two or three rows of transversely disposed, glistening epithelia, differing in translucency from those situated on either side. The stratum lucidum thus marks with tolerable distinctness the boundary lines of the rows of cells above and below it. Its cells no longer contain the granules of keratohyalin, conspicuous in the stratum granulosum below, but in their place have acquired an oily-looking substance termed *eleidin*. Eleidin, though oily-looking, is not a fatty substance. It differs from keratohyalin physically and chemically, but MacLeod suggests that it may be a derivative of keratohyalin.¹

The cells of the uppermost layer of the stratum lucidum have been termed the *stratum intermedium* by Ranvier, for the reason that they take a reddish stain after treatment with picrocarmine. In this layer the process of keratinization is first detected.

Stratum Corneum (*Horny Layer*) of the epidermis is its outermost and widest layer. In its lower portion, the cells still retain to a degree the shape of the cells below, indicating their relationship. Nuclei exist in this layer only as shriveled and inconspicuous relics. Occasionally, on the edges, rudiments of prickle-cells may still be recognized. More externally, the dried, lifeless, horn-like plates of which this layer is composed become mere cornified shells, generally lying in horizontal strata and becoming more curled and wrinkled as the surface of the skin is reached, often being imbricated, but preserving the polygonal outlines of epithelia relieved of the forces of pressure and counter-pressure exerted in the deeper part of the epidermis. No pigment is present in this layer, except in the colored races. The cells contain a fatty material, which adds to the suppleness of the skin and prevents undue evaporation, and also absorption from the outside. The hard, dry character of the cells is due to a resistant substance termed *keratin*, which has replaced the keratohyalin of the stratum granulosum and the eleidin of the stratum lucidum. Keratin is insoluble in 50 per cent. dilution of mineral acids, and resists digestion in a solution of pepsin containing weak hydrochloric acid, but is soluble in weak alkaline solution.

After digestion with pepsin and trypsin, the horny cells may be seen to be connected by more or less persistent threads, forming a

¹ Cf. MacLeod's Pathology for complete discussion and description of keratohyalin and eleidin, p. 61.

large-meshed reticulum, with strands formed from a double row of cornified filaments united by short, horny bridges.

Stratum Disjunctum.—This is the most superficial layer of the stratum corneum, and only differentiates by staining methods.

Spiral Fibers.—Herxheimer's¹ spiral fibers are found chiefly between the cells of the rete and the basal layer of the epidermis. They are most abundant normally in the lower part of the rete, and become increased in number in inflammatory conditions. They lie for the most part parallel with the long axes of the rete-cells. They sometimes are found between the cells of the inner root-sheath of the hair-follicle. Opinion differs as to their nature. Jadassohn, Ehrmann,² MacLeod³ and others believe them to be spirals of fibrin. This seems probable, since they are increased in number when an inflammatory reaction is present, and since they occupy the lymph-spaces between the cells and in size correspond with these spaces. They have in the past been regarded as elastic fibers protruding from the corium below; as parts of a canal system for the conveyance of nutriment to the cells of the epidermis, etc.

Cornification.—The process by which the epithelial cell from the basal layer of the rete becomes transformed into the hard, resistant cell of the stratum corneum has been studied at length, and the part played by the keratohyalin of the granular layer and eleidin of the stratum lucidum in the formation of keratin has caused much controversy. While, as a rule, when cornification is perfect both keratohyalin and eleidin are present normally, and when these two are absent or imperfectly formed cornification is incomplete, yet cornification may occur without the intercurrent of these substances. MacLeod considers keratohyalin as "a separation product of the protoplasm of the cell which appears as the vitality of the cell is diminishing; eleidin, a further product of the same substance; and the ultimate product of both is probably the fatty or waxy substance which is present in the horn cells." "The intercellular bridges or prickles would, according to this hypothesis, become hardened into keratin by an inherent power of their own, in much the same way as the fibro-vascular system of a leaf at the fall of the year becomes hardened into a brittle leaf skeleton."

Blood-Vessels.—The skin is richly supplied with blood-vessels, particularly on its flexor surfaces. It is customary to describe the blood-vessels in the skin as consisting of an upper and a lower plexus or ridge-net. A more simple explanation of the vascular supply than that formerly made has been given by MacLeod.⁴ Practically the entire supply comes from a system of blood-vessels situated in the subcutaneous tissue. There is in addition a horizontal plexus located in the papillary layer of the corium, the latter being formed

¹ Arch., 1889, p. 645

² Arch., 1892, *Ergänzungsheft*, i, p. 307; and *Monatshefte*, 1897, xxiv, p. 549.

³ MacLeod's *Histopathology of the Skin*, 1903, p. 59.

⁴ *Ibid.*

by a series of arteries and capillaries running more or less vertically from the subcutaneous plexus and branching horizontally in this region. Taken as a whole, the larger arteries divide and subdivide, eventually becoming capillaries, which join venous capillaries and return by anastomosis to the subcutaneous veins by the junction of the various tributaries, thus following a return course similar to that taken by the arteries. In the subcutaneous tissue the course of the vessels lies between the lobes and lobules, and after dividing into small branches these surround and supply the fat-cells. A plexus of vessels, chiefly derived from the subcutaneous group, is also found about the coil-glands, the remainder of the sweat-apparatus being supplied largely from vessels in the corium. The sebaceous glands, hair-follicles, and arrectores pilorum are also freely supplied with plexuses of vessels. The major portion of the vessels in the subcutaneous tissue have an endothelial lining and a muscular and adventitious coat, while those of the corium are supplied with an endothelial lining only.

From the horizontal plexus in the papillary layer loops are sent to each papilla. These are either single or compound, the returning venous capillary being about four times the diameter of the arterial capillary. Special venous sinuses lined with endothelium are found in the tips of the fingers and toes, the lobes of the ears, the nostrils, the lips, and the nail-beds. In inflammatory and other pathological conditions of the skin, most marked perivascular infiltration occurs in the regions about the glands and hair-follicles and in the papillary layer, thus indicating the distribution of the greatest number of vessels.

Nerves.—The skin, in view of the number and mode of distribution of its nervous elements, may be regarded as a vast area of sensitive nerve-terminals. Non-medullated and medullated nerve-fibers, each in places being substituted for the other, are supplied to the skin from horizontally disposed bundles of nerve-twigs in the subcutaneous tissue. These fibers traverse the corium in connection with the blood-vessels, and become finer as they ascend, until they form a subepithelial plexus below the epidermis.

Non-Medullated Fibers are exceedingly delicate fibers, penetrating in great abundance to the epidermis between the epithelia, and are not to be confounded with the migratory cells found in this situation. Here, traversing the intercellular substance by the side of the juice-spaces, these fibers either terminate between the prickle-cells as ultimate bulbous terminations of finely beaded fibrillæ, or penetrate the epithelia themselves in pairs. Each prickle-cell is supplied with a pair of these beaded filaments, which may be either applied to the nucleus of the cell or be seen to encircle the nucleus more or less completely. Above the stratum granulosum these nervous threads cannot be recognized.

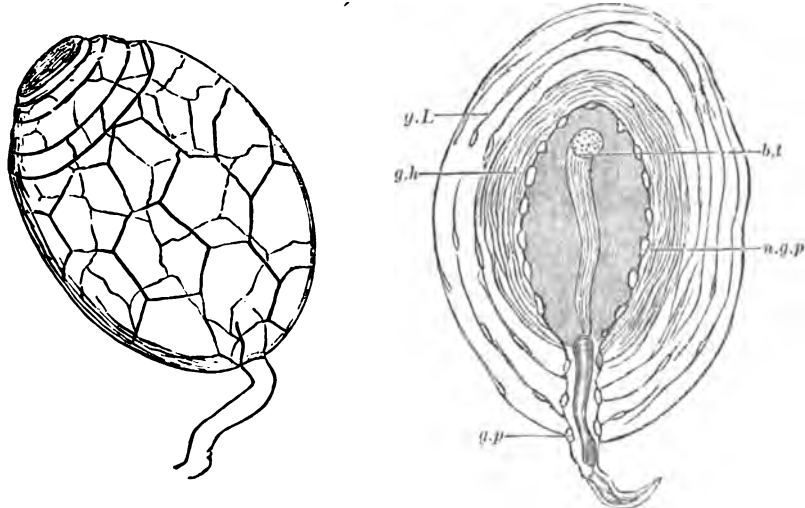
Similar nerve-filaments are supplied to the sheaths of the hairs and the ducts of the coil-glands. It is by means of these numerous

and delicate fibers that the perception of sensation in the skin is accomplished.

Motor filaments are also distributed to the sheaths of the blood-vessels (vasomotor nerves), in which they are finally lost. Other motor filaments supply the muscles, and trophic nerves are distributed to all the secreting organs of the skin and to all its protoplasmic formations.

Medullated Nerve-Fibers of the skin in one or several loops pass upward into the papillæ, and then turn backward to the subpapillary region. Some of these fibers, after such reversion, again ascend to an adjacent papilla; others are supplied to the Pacinian and tactile corpuscles.

FIG. 8



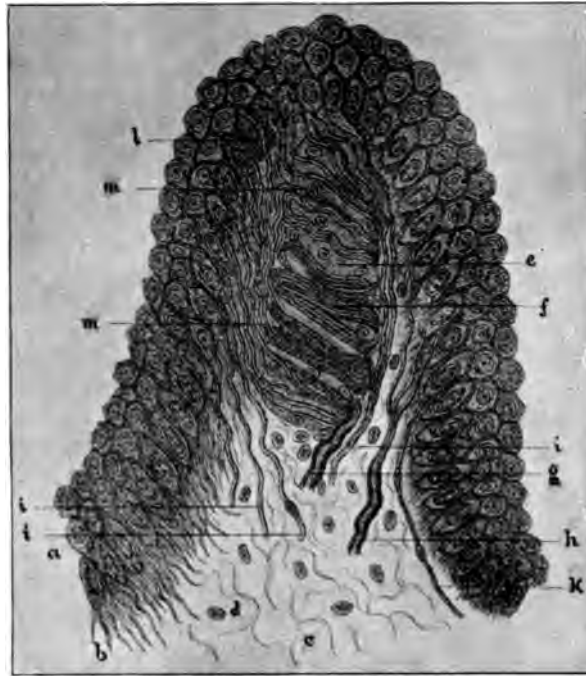
Pacinian body, after silver staining, showing superimposed endothelial layers. (After Renault.)

Section of Pacinian body from a duck's bill: *g.L.*, lamellar envelope; *g.h.*, hyaline zone of the lamellar envelope; *b.t.*, terminal bulb of the nerve; *g.p.*, *n.g.p.*, layer investing the cavity of the body. (After Renault.)

Pacinian Corpuscles (named from the anatomist Pacini), also called *Corpuscles of Vater*, exist subcutaneously only upon nerves intended for cutaneous supply. They are ovoid bodies, two or more millimeters in diameter. Each corpuscle consists of a series of concentric, nucleated, vascular capsules, arranged after the manner of the capsules of the onion, more closely united at the periphery than at the centre, and surrounding a protoplasmic core. The medullated nerve to which the body is attached gradually loses its myeline envelope, and terminates in the centre of this core, after traversing the greater part of its axis, in one or several minutely club-shaped filaments. The myeline sheath is lost in the tissue of the concentric capsules. The nerve may, after supplying one capsule, penetrate a second or

even a third. In such cases the nerve regains its sheath as it issues from the corpuscle at its opposite pole. Robinson believes that the nerve forms a plexus or loop within the corpuscle, and escapes from it at one of its poles.

FIG. 9



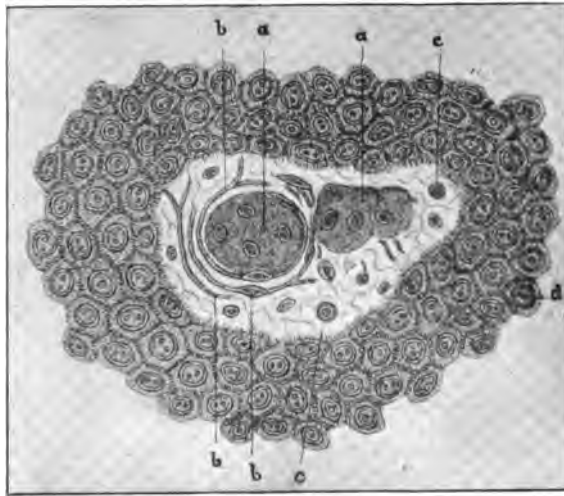
Section of a papilla still covered by a portion of the stratum mucosum and containing a tactile body (from the skin of a finger). The corpuscle of Meissner is seen to consist of minute lobules, made up of a homogeneous protoplasm, with numerous oval nuclei and nervous fibrillæ wound in a spiral direction about the mass of the corpuscle. The extension of the fibrillæ to the mucous layer is shown. The courses of the nerve-filaments are demonstrated to be: (1) the axis-cylinders of one or two double-contoured nerve-fibers, splitting into their original fibrillæ on arriving at the corpuscle, winding about the latter in characteristic spirals, and passing to the palisade-layer of the prickles of the rete, between which, on account of the long prickles of the latter and the general resemblance of the two in thickness and contour, it is difficult to trace them further; (2) filaments from another double-contoured nerve-fiber (*h*) pass directly to the inferior layer of cells in the rete without establishing relations with the tactile body; (3) fibrillæ derived from the network of nervous fibrillæ in the pars papillaris of the corium (*K*), also passing more or less directly to the stratum mucosum; *a*, cells of the rete; *b*, prickles of the latter; *c*, body of papilla; *d*, nuclei of connective tissue forming papilla; *e*, protoplasmic part of the tactile body with its nuclei; *f*, fibrillæ of the corpuscle; *g*, double-contoured nerve-fibers directly supplying the rete; *h*, nervous fibrillæ derived from the network in the pars papillaris; *i*, nervous fibrillæ entering the epidermis between the rete-cells leaving the corpusculum tactus at *m*.

The precise function of the Pacinian corpuscle is unknown. Its connection with the tactile sense is suggested by its location, since these bodies are most numerous in the subcutaneous tissues of the

nipple, the penis, the digits, and in parts similarly sensitive. These corpuscles bear an analogy to the organ of vision, each body having a capsular character; each being provided with a special nerve-filament, which enters the corpuscle at one pole; each also receiving its impressions at the extremity of the capsule opposite that at which it receives its nervous supply.

According to Krause, the Pacinian corpuscles aid in the appreciation of impressions produced by pressure and traction. Whether specially concerned in distinguishing sensations of heat, cold, moisture, pressure, traction, or weight, it is evident that they contribute but little, if at all, to the perception of ordinary impressions upon the skin, and they are not known to play any part in cutaneous diseases.

FIG. 10



Transverse section of nervous papilla surrounded by cells of the stratum mucosum: *a*, protoplasmic lobules of the corpusculum tactus; *b*, nervous fibrillæ spirally wound about the latter; *c*, transverse section of double-contoured nerve-fibers; *d*, cavity of nucleus (out of focus).

Tactile Corpuscles (*Corpuscles of Meissner or of Wagner*) are ovoid bodies found in about one in four of the papillæ in the pars papillaris of the corium. Each corpuscle is composed of from one to three capsules. Minute lobules of a homogeneous protoplasm with oval nuclei are found in each. These corpuscles receive medullated nerve-fibers, and are made up of closely compressed, flat, connective-tissue fibers with minute nuclei, which are so packed together as to form a spindle-shaped mass occupying the greater part of the papilla in which each corpuscle is found and surrounded by a somewhat denser connective-tissue capsule. The myeline sheath of the nerve-fibers

is lost in the fibrous tissue of the corpuscle. Externally viewed they seem to be transversely striated.

The axis-cylinder of the nerve-filament distributed to each corpuscle divides into numerous delicate nerve-threads, which in part encircle the corpuscles and also penetrate within. Each corpuscle is provided with an afferent and an efferent nerve, the former approaching the corpuscle from the subpapillary region and entering at or near its base. Occasionally the afferent fiber is furnished by an adjacent papilla. As the filament that enters the corpuscle frequently divides, two or more efferent fibers may then escape from it. Afferent fibers reach the rete above after encircling the tactile corpuscles; others, side by side, arrive at the rete without coming into contact with the former.

The discovery of nerve-filaments in and among the epithelia of the epidermis in such abundance as to provide fully for tactile sensation in the skin leaves the exact function of these corpuscles in partial obscurity. There can be little doubt, however, as to their association with the perception of certain qualities of foreign bodies with which the skin may be brought into contact.

Touch-Cells.—Merkel's touch-cells are oval, nucleated bodies found in the lower animals, but also in man. They are supposed to be connected with the ultimate nerve-fibers. They resemble cells in a mitotic state, and are found in the upper parts of the corium as well as the epidermis, and in regions in which the tactile corpuscles are few, as over the abdominal surface.

Corpuscles of Krause (*Bulb-Corpuscles: Kolbenkörperchen*) are rounded or oval-shaped bodies formed of a connective-tissue envelope and a non-nucleated bulb, to which some delicate nerve-fibers penetrate. These bodies are found chiefly along the borders of the lips, over the glans penis, the clitoris, and the tongue.

Lymphatic Vessels.—The skin in all its parts is provided with a closed system of lymphatic channels, designed to subserve the necessities of the important processes of absorption, and is traversed by lymph, the currents of which are continuously directed to the large vessels of the structures beneath the skin. These channels include: first, juice-spaces, provided or not with independent walls, usually without, and not freely communicating with the endothelium-lined vessels; second, lymphatic vessels proper. These conduits do not connect with blood-vessels.

The juice-spaces, or lymph-spaces, separate the epithelial bodies which make up the stratum mucosum of the epidermis, and they also extend between the protoplasmic threads, or prickles, that unite them. Such conduits may be regarded either as delicate excavations in the cement-substance between the epithelia, or as irregular channels in a soft, viscid, albuminoid, and readily coagulable substance between the protoplasmic threads. At times this intercellular substance seems capable of obstructing the conduits by which it is tunnelled. These juice-spaces exist in the papillæ of the corium, and encircle the several

glands, hair-follicles, and nail-beds of the skin. They also sheathe the connective-tissue fibrillæ of the corium and surround the fat-cells. According to Darier, the derma is a "true lymphatic sponge."

The lymphatic vessels are relatively few, but they form a continuous meshwork, with transversely and vertically disposed branches supplying all parts of the skin below the epidermis. The juice-spaces communicate with these vessels in the papillary portion of the corium through minute orifices in the vascular walls, the vessels themselves being here represented by blind terminal loops. As these vessels pass to the deeper portions of the corium and below it they increase in size. The current of the lymph flows from the papillary apices to all parts of the rete, like the currents in the delta of a river, a reflux occurring at the lower limit of the interpapillary depressions of the rete downward, possibly through the sweat-pores which traverse the epidermis at these points. Thence the current flows freely downward to the lymphatic vessels in the corium, but the stream from the juice-spaces about the coil-glands and fat-tissue is retarded by reason of a more restricted communication with the lymphatic vessels below. In consequence of the retardation due to this anatomical peculiarity the formation of fat by filtration is facilitated.

Muscles.—Striated Muscular Fibers extend from the subcutaneous tissue into the derma; in the case of man they are found chiefly upon the face and neck, where they are the analogues of more powerful skin-moving muscles possessed by several of the lower animals. Some, as those in the region of the face, serve to give expression to mental emotion by the production of facial movements.

Non-Striated Muscular Fibers exist either as minute oblique fasciculi in connection with the glands and follicles of the skin; as annular bands, such as those which surround the nipple; or as radiating and more or less parallel rods, such as antagonize the orbicularis in the eyelids.

Arrectores (Erectores) Pilorum.—These muscles are found usually in connection with the hair-follicles. They originate by minute multiple fasciculi from the papillary portion of the corium, and are inserted at several points into the outer layer of several adjacent hair-follicles, just above the plane of the apex of the hair-papillæ. Their general direction is oblique, and their muscle-bundles are embraced and traversed by elastic fibers, which form a dense network about them. Elastic threads also connect them intimately with the connective-tissue bundles of the corium, and serve as tendons at either extremity of each muscular fasciculus.

The muscles, by virtue of their oblique direction and mode of attachment, include in the angle subtended by their muscular fibers the sebaceous glands connected with the hair-follicles. It follows, therefore, that by their contraction they aid in the expulsion of the sebaceous secretion formed in the gland; but their intimate union with the elastic tissue, which is evenly and generally distributed throughout the framework of the corium, results in their discharge

of a still more important function in connection with the regulation of the body-temperature; since by virtue of direct compression exerted upon the skin the blood may be driven from the surface in a centripetal direction and its cooling in a great degree prevented, as in the well-known phenomena resulting in the production of the *cutis anserina*, or "goose-flesh." The reverse of this naturally follows when the muscles expand under the influence of external heat. The anatomical connections of the *arrectores pilorum* are such that their contraction serves to approximate several of the papillæ of the corium, including the hair-papilla. Thus, by their contraction, the sebaceous secretion may be extruded, or, as is more particularly exhibited in the lower animals, such hairs as the bristles of the boar may be erected.

Muscular membranes exist in the skin of the scrotum, over the penis, about the nipple, and elsewhere. They are simply layers of smooth muscular fibers, which suffice when contracting to move the portions of skin to which they are distributed.

Pigment.—The hue of the living integument is due in part to the degree of vascularity and distention of the vessels in the corium, and in part also to pigmentation of the epidermis. The coloring matter of the skin in health is deposited chiefly in from one to four rows of cells in the lower stratum of the rete, the fine granules of pigment staining both the cell-body and the nucleus, the latter more vividly. The pigment of the skin depends for its hue upon a substance called *melanin*. Its office is obvious. It is designed to absorb rays of light, and thus to aid in the protection of the body from undue insolation.

The degree of vascularity of the skin is responsible for most of the flesh-tints, but the colors seen in the various races of men are wholly related to the character and quantity of pigment found in the rete. Rarely, pigment-cells are found in the corium in a state of health. This pigment depends upon a distinct and uniform coloration of the epithelia, and also upon minute granules of melanin entangled in the reticulum of living matter in the same part. Extreme variation in the distribution of pigment is noticeable both in health and in disease, and in individuals and races, being at times related to climatic and similar influences. This fact is well illustrated by the wide range between the flaxen-haired, pink-eyed albino and the blackest specimens of the negro, each, with small exception, being of African descent.

It has already been noted that in the colored races the pigment may stain the epithelial cells and their nuclei as high as the granular layer; and that to this layer only is due the characteristic color of the skin of the white races. Pigment is not normally found either in the horny layer of the skin or in the subepithelial tissues.

The source of the pigment in the skin has been the subject of much study. Karg,¹ Kölliker,² and Ehrmann³ all support the view of the derivation of the pigment from the hemoglobin and its transference

¹ Archiv f. Anat. u. Physi., 1888, p. 369.

² Zeitsch. f. Wissensch. Zoolog., 1887, xlv.

³ Vierteljahr., 1886, xiii.

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³ Vierteljahr., 1886, xiii.

to the basal layer of the epithelium by special cells (*melanoblasts*, *chromatophores*). Ehrmann considers these pigment-bearing cells derivatives from the mesoderm and different from connective-tissue cells or leukocytes. Delépine,¹ Jooss,² and more recently Meirowsky,³ Helmich,⁴ McDonagh,⁵ Dyson,⁶ and Kreibich⁷ consider that the pigment is independently produced in the epithelial cells.

The experimental work carried on by these observers appears to prove conclusively that the epidermal pigment is formed in the individual epithelial cells, the formation beginning in the nucleus and spreading from this situation throughout the cell. It is further believed by some that independent pigment-cells may be produced in the corium.

Hairs.—The study of the anatomy of the hair-apparatus includes the structure of the hairs themselves and the follicles in which they are implanted. Hairs are distributed over the entire cutaneous surface, except on the palms and soles, the dorsal surface of the distal phalanges of the hands and feet, and the skin of the penis. They occur in three classes: the fine, downy hairs, or lanugo, covering the face, the trunk, and the limbs; the long, soft hairs found on the scalp, over the pubes, and in the axillæ; and the short hairs, which include the soft varieties found on the brow and the stiff hairs of the eyelids. The wide variation in color depends upon the amount of pigment granules, the soluble coloring matter, and the air which they contain. Hairs, on cross-section, are round, oval, or more or less flattened. The portion of the hair included in the skin is termed the *hair-root*, and its lowermost portion the *hair-bulb*. That portion extending from the surface to the free extremity is termed the *shaft*, and the terminal end the *point*.

The bulb is a club-shaped expansion of the lower end of the hair, implanted upon and surrounding a nipple-like projection of the corium termed the *hair-papilla*, which resembles the vascular papilla of the papillary layer of the corium. When uncut and normal, the external extremity of the hair ends in a sharp point.

The distribution of the hair is determined by the fibrous tissue of the corium, and corresponds closely with the lines of cleavage of the skin. In certain areas, such as the vertex of the scalp, the hairs are arranged in a circular manner, forming whorls.

On cross-section the hair presents a cuticle, a cortex, and a medulla, and is composed of epithelial cells.

Cuticle.—The external layer of cells of the hair is termed the cuticle. This is composed of cells quadrilateral in shape, flat and regularly

¹ Proceedings of Physiological Society, 1890, vi, p. 23; quoted by MacLeod, *Histopathology*, p. 306.

² Münch. med. Abhandl., I, Heft. xvi; quoted by MacLeod, *Histopathology*, p. 306.

³ Monatshefte, August 15, 1906, p. 155; abstr. Jour. Cut. Dis., 1907, xxv, p. 192.

⁴ Monatshefte, Bd. xlv, No. 4, 1907, August 15, p. 184; abstr. Brit. Jour. Derm., 1908, xx, p. 169.

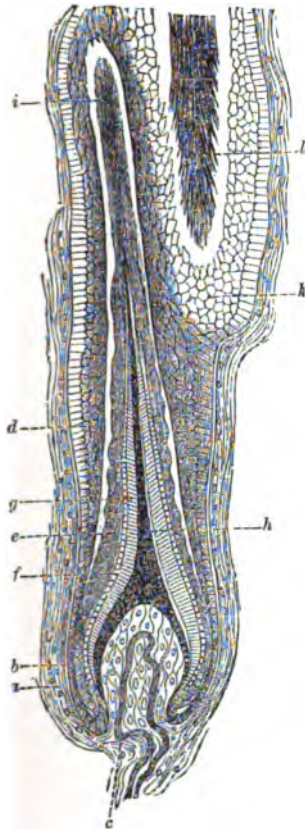
⁵ Brit. Jour. Derm., 1910, xxii, p. 316.

⁶ Ibid., 1911, xxiii, p. 205.

⁷ Archiv, cxviii, No. 3; abstr. Brit. Jour. Derm., 1914, xxvi, p. 171.

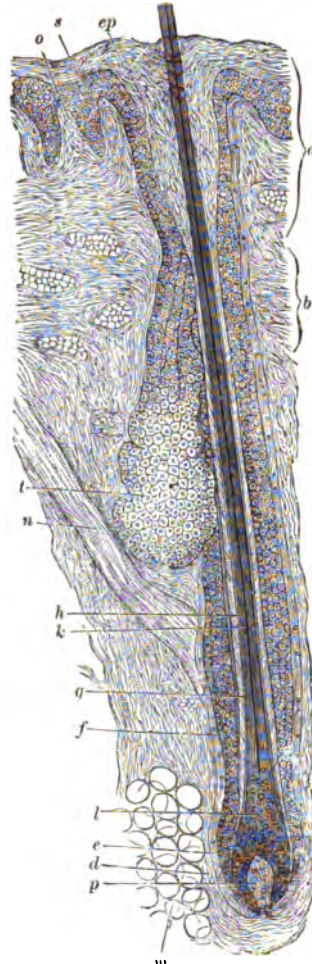
overlaid, resembling the tiles on the roof of a house. They have their long axes directed upward and outward at an acute angle with the shaft.

FIG. 11



Section of a hair-follicle during the formation of a new hair: *a*, external and middle root-sheaths; *b*, vitreous membrane; *c*, papilla with vascular loop; *d*, external root-sheath; *e*, internal root-sheath; *f*, cuticle of hair-follicle; *g*, cuticle of hair; *h*, *i*, young hair; *l*, bulb of old hair; *k*, debris of external root-sheath of hair recently expelled. (After Ebner.)

FIG. 12



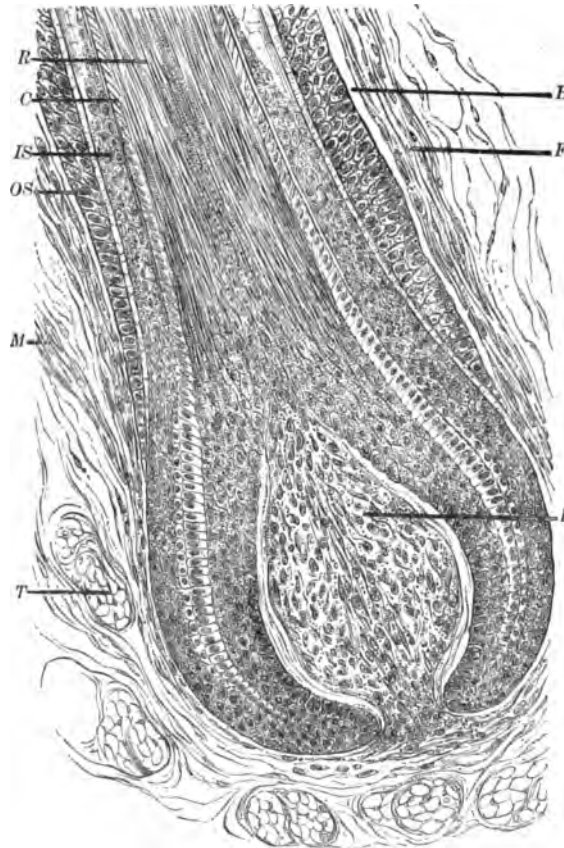
Hair-follicle in longitudinal section: *a*, mouth of follicle; *b*, neck; *c*, bulb; *d*, *e*, dermic coat; *f*, outer root-sheath; *g*, inner root-sheath; *h*, hair; *k*, its medulla; *l*, hair-knob; *m*, adipose tissue; *n*, hair-muscle; *o*, papilla of skin; *p*, papilla of hair; *s*, rete mucosum, continuous with outer root-sheath; *ep*, horny layer; *t*, sebaceous gland.

Cortex.—In its upper portion, the hair consists entirely of the cortex. Lower down a medulla is present. The cells of the cortex are spindle-shaped and have a fusiform nucleus. They contain color-

ing matter, and between them are found pigment-granules and air-spaces. The strength, elasticity, and extensibility of the hair are due to the arrangement of the cells of the cortex.

Medulla.—The medulla occupies the centre of the hair and extends a variable distance up the shaft. In its upper portion, it consists of several rows of flattened epithelial cells, which near the bulb become cubical in shape and contain keratohyalin. In the lanugo hairs the medulla is absent.

FIG. 13



Lower portion of hair-pouch from the lip of a kitten: *F*, follicle; *T*, transverse section of connective-tissue bundles of derma; *M*, arrector pili muscle; *IS*, inner root-sheath; *OS*, outer root-sheath; *P*, papilla; *C*, cuticle; *R*, root of hair; *H*, hyaline, or so-called "structureless," membrane. Magnified 500 diameters. (After Heitzmann.)

Hair-Follicle.—The hairs are implanted in the skin in a series of invaginations called hair-follicles. Usually, only one hair springs from a single follicle, but occasionally there may be two or more. The hair-follicle is an elongated, cylindrical pouch, dipping down into the corium, and at times into the subcutaneous tissue. Its upper

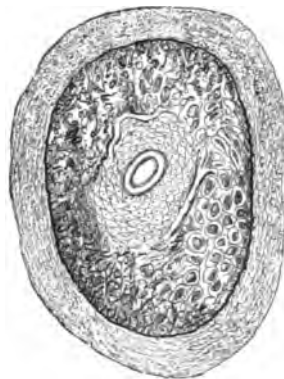
portion, termed the mouth, is funnel-shaped and opens directly upon the cutaneous surface. The neck of the follicle is its narrowest portion, and is situated at the junction of the middle and upper thirds, and at this point occur the orifices of the sebaceous glands. Below this the pouch gradually enlarges to end in a bulbous extremity, which contains the hair-bulb and hair-papilla. The follicle has a fibrous portion derived from the corium, and an epithelial portion made up of the various layers of the epidermis. The fibrous coat of the hair-follicle is divided into three layers: an external, thin, dense layer of connective-tissue fibers and cells, arranged in a longitudinal direction; a middle, thicker layer, with a circular arrangement of the fibers and bundles; and an internal, condensed layer, presenting a homogeneous appearance. This last-mentioned layer is commonly described as the *hyalin layer*, or vitreous layer, and is present chiefly in the lower part of the follicle. The epithelial portion of the hair-follicle is composed of the various layers of the epidermis. The layer next the hair, corresponding to the stratum corneum, is termed the cuticle. External to this is a complicated structure termed the internal root-sheath; and outside of this is the external root-sheath, which is virtually a continuation of the prickle-cell layer of the epidermis.

Cuticle.—The cuticle is composed of a single layer of elongated cells, with their long axes arranged downward and inward. By recalling the arrangement of the cells of the cuticle of the hair, it will be seen that by the special arrangement of the cells of the two cuticles they interlock and thus make a firm union between the hair and its follicle. This anatomical arrangement accounts for the removal of a part of the root-sheath when a hair is epilated.

Internal Root-Sheath.—The internal root-sheath occupies the lower two-thirds of the hair-follicle. The inner part of this sheath is known as the "sheath of Huxley," while its outer portion is termed the "sheath of Henle." The cells of the inner portion (sheath of Huxley) are nucleated and contain granules of keratohyalin. Those of the outer portion (sheath of Henle) are smaller, have lost their nuclei, and have become cornified. There are spaces between these cells through which processes from the cells of the inner layer extend, on account of which this layer has been described as a fenestrated membrane. In the upper part of the follicle, these two layers lose their identity through the cornification of the cells of the inner layer.

External Root-Sheath.—This is represented by a continuation of the stratum mucosum downward into the follicle. The stratum corneum and the stratum granulosum accompany the stratum mucosum down-

FIG. 14



Transverse section of hair and follicle.

ward as far as the opening of the sebaceous gland at the neck of the follicle. From here downward to near the papilla the stratum mucosum consists of several layers of polyhedral epithelial cells, while near the base of the papilla it is reduced to a single layer of cells.

Hair-Change.—During life, the hairs are being constantly shed and replaced by new ones. In the scalp, they are said to have an existence of from two to four years, when they are replaced by new ones. In addition to the intermittent falling of the hairs, there are certain periods during which great changes occur. Immediately after birth, the hairs grow actively on the scalp. At puberty, hairs appear in certain regions, such as the beard, the axillæ, and about the genitalia. In middle life and later years, hairs grow in and about the ears and nostrils. In females, after the menopause, there is frequently an increase of hairs on the face. All these hairs (called “periodic hairs” by MacLeod) are pigmented and coarse, while those of the rest of the body retain their unpigmented condition.

Nails.—Nails are compact, solid plates of highly cornified epithelial cells, situated on the dorsal surface of the distal phalanges of the fingers and toes. They are convex from side to side, also from before backward, but to a less degree. Three edges of the plate are inserted into the skin, one, the anterior, being free. The posterior edge is slightly concave, the lateral edges straight and parallel, and the anterior edge convex. The visible portion of the nail-plate is termed the *body*, the posterior one-fifth of which is occupied by a semilunar, whitish portion, termed the *lunule*. The portion of the nail-plate embedded posteriorly is called the *root*. The three edges of the nail-plate rest in a depression termed the *nail-groove*; and the skin extending from this over the nail for a short distance laterally, but further posteriorly, is called the *nail-fold* or *nail-wall*. The thin, crescentic membrane extending from the posterior wall a short distance over the lunule represents the remains of the *eponychium*. The *hyponychium* is that portion of the epidermis upon which the nail-body rests, and the *perionychium* is that portion of the epidermis surrounding the entire nail-border.

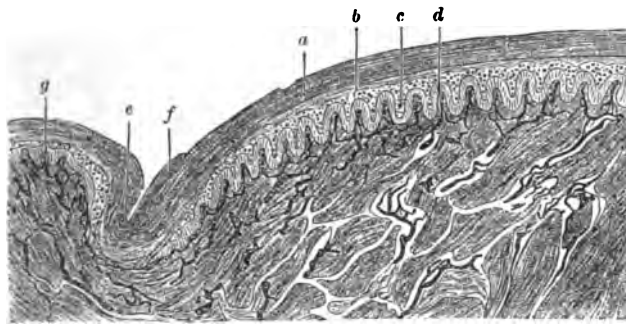
The following structures are presented for microscopic study: the nail-fold, nail-matrix, nail-bed, and nail-plate.

Nail-Fold.—The nail-fold is divided into an upper and a lower portion by the nail-root. The upper portion, extending backward, consists of the various layers of the epidermis forming a roof for the nail-root. The stratum corneum lies upon the nail-root, and the finger-like projections of the rete are obliterated and represented here by a straight line. The lower portion, extending forward beneath the nail-root, represents the nail-matrix.

Nail-Matrix.—The nail-matrix corresponds to the lower portion of the nail-fold, and extends forward to the anterior margin of the lunule. It is composed of a prickle-cell layer continuous with the same layer behind forming the roof of the nail-fold, and in front with the prickle-cell layer of the nail-bed. The prickle cells in this situa-

tion are larger than those of the same layer anteriorly and posteriorly. Interpapillary ridges are present and are more marked posteriorly. The matrix is composed of layers of cells analogous to those of the epidermis, with some variation noted, as follows: A basal layer, composed of regular, cylindrical epithelial cells. Immediately above this are from three to ten rows of cells of polygonal shape, and above this several rows of flat, closely-packed cells, having shriveled nuclei and containing fine granules. Above this are found the horny complete nail-cells. The nature of the granules mentioned in the transitional layer is not settled. Ranvier (quoted from MacLeod) terms them *onychogene*. Okamura¹ regards them as keratin granules within the cells. A third hypothesis is that they are shrunken prickles "seen in relief" (MacLeod).

FIG. 15



Vertical section of one-half of nail and matrix: *a*, nail-substance; *b*, horny layer; *c*, mucous layer; *d*, papillæ of corium; *e*, nail-furrow destitute of papillæ; *f*, horny layer of the ungual furrow rising above the nail; *g*, papillæ of skin of dorsal surface of the finger.

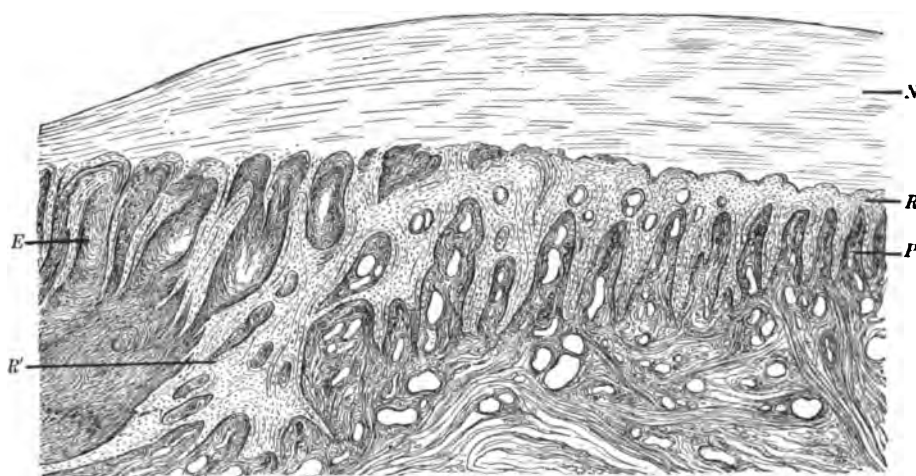
Nail-Bed.—The nail-bed extends forward from the matrix to the horny layer of the pulp which joins the nail at its free edge. The nail-plate rests upon the nail-bed. The nail-bed has a basal layer of cells presenting longitudinal edges, several layers of polygonal cells, and above these flattened cells, upon which the nail-plate rests.

Nail-Plate.—The nail-plate (*true nail*) is produced entirely from the matrix and is pushed forward over the nail-bed. The upper cells spring from the posterior portion of the matrix, while those beneath are produced by the anterior portion. It is suggested that the pressure exerted by the roof of the nail-fold helps to direct the growth forward in place of upward. The nail-plate is made up of flattened epithelial cells arranged in lamellæ, and each cell contains the remains of a nucleus. This cellular structure is best seen near the matrix; the cells further forward being so closely associated as to become an almost homogeneous mass. The under surface of the nail-plate is traversed by fine longitudinal ridges, which fit into corresponding depressions in the nail-bed.

¹ Archiv, 1900, lii, p. 223; quoted from MacLeod.

The process of cornification occurring in the nail is apparently accomplished without the interposition of keratohyalin and eleidin, and the final product differs from keratin in the degree of hardness and otherwise. Finally, the presence of shrunken nuclei in the cornified cell is different from the usual process of cornification described in the epidermis. The structure of the corium and subcutaneous tissue of the nail region presents certain peculiarities. Collagen-bundles radiate vertically from the periosteum of the phalanx to the epidermis of the nail-bed, closely binding these structures. Other collagenous bundles are present having a horizontal arrangement. Elastin is present below the matrix, and to a less degree beneath the nail-bed. Blood-vessels and lymphatics are present in this meshwork, and also a moderate amount of fat (MacLeod). The papillary body

FIG. 16



Implantation of a nail at its border: *P*, papillæ decreasing in size toward the middle line; *R*, rete mucosum, which broadens toward the border of the nail, and forms irregular prolongations; *R'*, *E*, epidermal layer; *N*, plate of the nail. Magnified 500 diameters. (After Heitzmann.)

has a special arrangement, described by Hans v. Hebra¹ (quoted from MacLeod). Beneath the matrix posteriorly occur from three to six rows of small, isolated papillæ. Anterior to this is seen a series of ridges, which are curved at the sides, but parallel with the long axis of the nail in the centre. On the edges of these ridges, rows of papillæ are present, giving this region the appearance of a cock's-comb. From here forward to the anterior part of the lunule the ridges flatten and papillæ are absent. The papillæ of the nail-bed are arranged on a large number of ridges running parallel with the long axis of the nail, and anterior to this the ordinary papillæ of the

¹ Wiener med. Jahrb. 1880, p. 59.

corium of finger-pulp occur. A copious supply of blood-vessels is found in the papillæ and ridges above described. Beneath this is a rich plexus of bloodvessels, on which various sinuses lined with endothelium are present. Into these sinuses the capillaries of the papillæ empty their contents.

The growth of the nail is continuous during the life of the individual, being more active in the young and during the summer season. From 100 to 160 days are required for the reproduction of a finger-nail and about three times that period for a nail of the toe.

FIG. 17

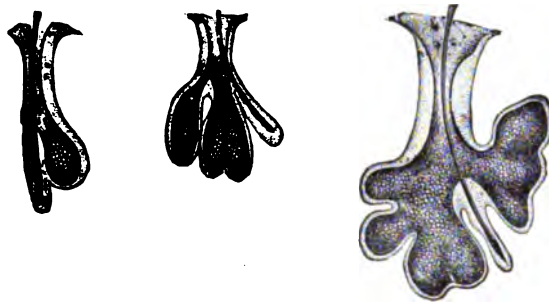
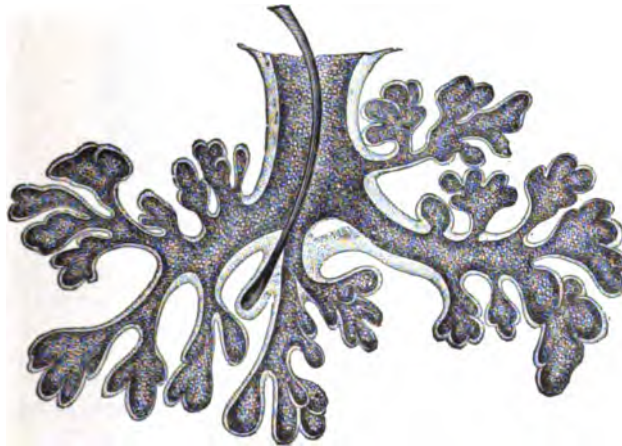


FIG. 18

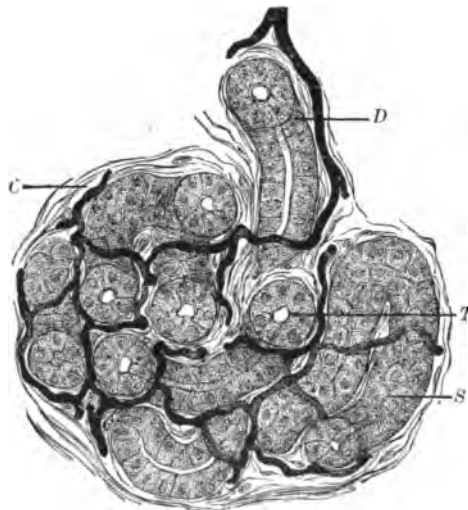


Sebaceous glands of the second class, from the alæ of the nose. (After Sappey.)

Glands.—**Sebaceous** glands, or sebiparous glands, are pyriform bodies, usually racemose in development, situated in the corium. They furnish a more or less consistent and fatty secretion, destined to anoint the skin and the hairs. They are divided into three classes. The first class includes the sebaceous glands that are appendages of the hairs and hair-follicles. They are developed early in fetal life from minute, lateral, bud-like prolongations from the outer root-sheath of the hair. From two to six of these prolongations spring

from the prickle-layer of the hair-follicle, and the prickle-cells in the axis of each bud speedily undergo fatty metamorphosis. In the mature gland, each acinus is formed of a *membrana propria* supporting layers of nucleated cuboidal epithelial cells furnishing fat. Gradually the fatty cells are pushed outward toward the duct of the gland, where, sooner or later, their rupture releases the drops of fat (sebum) just where the hair emerges from the closely applied follicle below to the funnel-shaped mouth of the hair-pouch above. Externally, each gland is provided with a layer of connective tissue provided with blood- and lymph-vessels and nerves. Sebaceous follicles are found in connection with the long, soft hairs, as those of the scalp and axillæ, several being grouped around a single hair-sac.

FIG. 19



Coil of a sweat-gland: S, tubule lined with cuboidal epithelia; T, central caliber of the tubule; D, beginning of the duct; C, connective tissue with injected blood-vessels. Magnified 500 diameters. (After Heitzmann.)

The second class includes the large and complex glandular structures to which the lanugo hairs seem accessory, the orifices of their respective ducts opening directly upon the cutaneous surface.

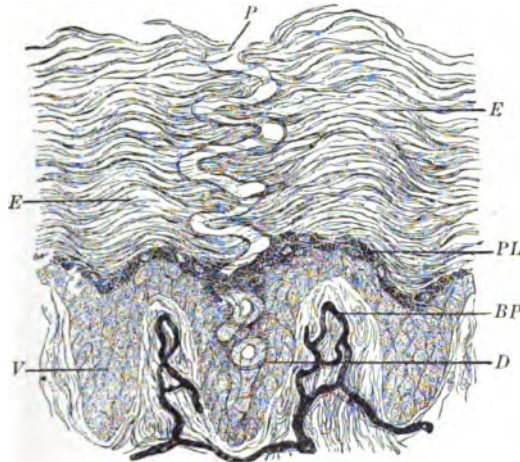
The third class includes those sebaceous glands opening directly upon the surface and unconnected with hairs or hair-follicles. Such are the glandulæ odoriferæ of the male and female genitalia, and those existing about the lips and in the areola of the nipple. These glands might be designated as "glands of the mucous orifices" (Unna).

Meibomian and Tysonian Glands.—These are of the largest order of sebaceous glands. The former exist within the free border of the eyelids; the latter upon the glans penis and the inner surface of the prepuce. They are unconnected with hairs, and differ in this respect from other types of sebaceous glands.

Glandulæ Ceruminosæ.—These are situated in the subcutaneous tissue of the meatus of the ear, and produce the waxy secretions found in this situation. The “glands of Moll” found in the eyelid are to be classed with the sweat-glands.

Coil-Glands.—Coil-glands (*sweat or sudoriparous glands, glandulæ glomiformes*) are found within the skin of all regions of the body, being exceptionally numerous in the palms and soles. They are situated in the subcutaneous tissue, as a rule, with an occasional one in the deeper part of the corium. In certain regions, such as the axillæ, the groins, the palms, the soles, and about the anus, the coil-glands are multiple and of unusual size, and often of peculiar arrangement. For descriptive purposes, the coil-gland apparatus is divided into the gland (the coil proper), the sweat-duct, and the sweat-pore.

FIG. 20



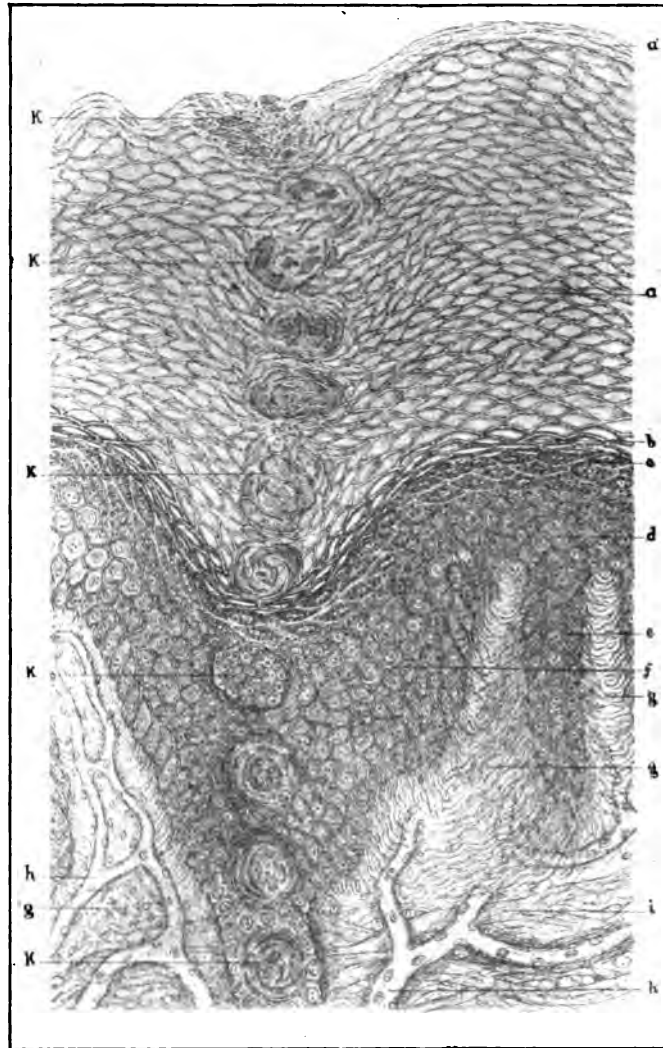
Sweat-pore traversing the epithelial layers of the skin: *BP*, papilla with injected blood-vessels; *V*, valley between two papillæ; *D*, duct in the rete mucosum; *E*, *E*, epidermal layer; *PL*, coarsely granular epithelia, deeply stained with carmine; *P*, duct with cork-screw windings in the epidermal layer. Magnified 200 diameters. (After Heitzmann.)

Coil.—The coil is simply the end of a tube coiled upon itself from a few to several times. The tube terminates in a cecal pouch and is lined with a single layer of nucleated cuboid epithelial cells, having a granular appearance. Outside of the tube are smooth, muscular fibers, running parallel with or in a spiral direction about the coil. Surrounding both muscle-bundles and epithelium, a connective-tissue membrane is described. The glomerulus or coil is globular in outline and reddish-yellow in color. In the larger glands, irregular dilatations and constrictions of the tube are conspicuous.

Coil-Duct.—The excretory duct of the coil-gland passes from the glomerulus below to the epidermis above in a straight or a spiral course. It is lined with delicate hyalin cuticle (Heynold), beneath which is a double layer of cuboidal epithelial cells. Externally is

a membrana propria, unprovided with muscular fibers. The external sheath consists of connective tissue. At the border line of the epider-

FIG. 21



Section of the skin from the palm of the hand (hardened in Moeller's fluid and treated with glacial acetic acid), magnified 300 diameters, showing epidermis and pars papillaris of the corium traversed by the excretory duct of a coil-gland terminating in a sweat-pore: *a*, stratum corneum; *a'*, its superficial layer, the cells in the upper and lower layers somewhat larger than those situated between the two; *b*, stratum lucidum; *c*, stratum granulosum; *d*, stratum mucosum; *e*, rete-pegs; *f*, interpapillary process of rete meeting duct of coil-gland; *g*, *g'*, papillae embraced by long prickles extending from lower palisade-layer of the rete; *h*, blood-vessels of papillae; *i*, bundles of connective-tissue fibers of pars papillaris; *k*, section of spiral duct of coil-gland and sweat-pore.

mis, the cuticle and external connective-tissue sheath are lost, and the duct here becomes a sweat-pore. It occasionally opens within a hair-pouch.

Sweat-Pore.—This is a continuation of the excretory duct of the coil-gland after the loss of its cuticle and connective-tissue sheath. The sweat-pore traverses the epidermis usually in a spiral direction, and terminates in a funnel-shaped opening through the stratum corneum. It is a wall-less channel, and therefore in free communication with the juice-spaces of the epidermis. This anatomical peculiarity provides fully for the needs of evaporation at the surface of the body.

The alternation of muscular fibers with the secretory cells of the ducts of the coil-glands is a provision for the extrusion of the gland secretion onward. The same anatomical arrangement permits communication between the epithelial cells and the lymph-spaces which reach into the connective-tissue sheath of the gland. As a result, the lymph flows freely among the secreting elements of the gland and its duct. This lymph, loaded with fat, streams away from the coils, and before it reaches the lymphatic trunks its fat-globules are filtered away in the subcutaneous tissue. The total number of coil-glands in the body is estimated to be between 2,000,000 and 3,000,000, and the total length of the uncoiled glands to be eight miles. These figures serve to give an approximate idea of their very great physiological importance and of the extent to which violation of the rules of hygiene possesses interest from a pathological view-point.

DEVELOPMENT OF THE SKIN.

From an embryological standpoint, the skin is composed of two layers, the epidermis and corium; the epidermis developing from the epiblastic layers, and the corium from the mesoblastic layers, of the blastodermic vesicle. The corium and subcutaneous tissue are now regarded as layers of a mesoblastic structure maturing from within outward, increasing by cell-division and by the formation of fibrous bundles and the deposition of fat in the deeper layers.

The epidermis early in the blastodermic vesicle consists of a layer of polygonal nucleated cells, termed "Rauber's layer," beneath which is a layer of cubical cells with large, round nuclei. Between the first and second months of fetal life three layers are distinguished most superficially: Rauber's layer, the cells of which have become flat; and two layers of columnar cells. About the third month, the "bladder cells" of Zander become demonstrable in the regions of the tips of the fingers and toes. These latter appear to be certain cells of Rauber's layer which have become swollen and dome-shaped (Bowen).

Epitrichial Layer.—Welcker, Minor, and Bowen¹ have described a layer of large cells, with round nuclei much larger than those of the epidermal layers beneath, covering the entire body of the human

¹ Jour. Cut. Dis., 1895, xiii, p. 485.

embryo during the early months of its existence. This layer, histologically, is quite distinct from the outer cells of the stratum corneum, and corresponds with the epitrichium of certain animals. It usually disappears before the sixth or seventh month of intra-uterine life.

At the end of the fourth month, the epidermis consists of five or six rows of cells: a superficial row of flattened cells, beneath which are several rows of cells of polygonal shape. In the lowermost layer, mitotic figures may be demonstrated. By the sixth month, marked proliferation has taken place in the epidermis, and the epitrichium has disappeared except in the fingers and toes and over the developing nails. By this time, also, the proliferating epidermis has formed the papillæ, and a short time later (about the seventh month) the prickle-cells take on their peculiar characteristics. Keratohyalin granules become evident about the eighth month, and keratin is also present in the cells of the stratum corneum.

Coil-Glands.—The first evidence of the coil-glands may be found in the palms and soles, between the fifth and sixth months, as a conical down-growth of the epidermis. Very shortly afterward, these gland rudiments spread over the entire subcutaneous surface, except that part occupied by hairs. The rudiment gradually pushes downward into the corium and becomes constricted near the upper part, forming a neck, and widens out beneath into a globe-shaped thickening. These down-shoots occur over the interpapillary processes of the epidermis, and the cells are those composing the epidermis from which it sprang. Between the sixth and seventh months, the central cells of the developing gland break down and the beginning of a canal becomes appreciable. When this rudiment reaches a certain position in the corium, the end turns and the subsequent growth produces a coil.

Sweat-Pores.—The sweat-pores are first demonstrable between the seventh and eighth months, some time after the gland is fully developed. Fat-globules may be seen in and between the cells of the coil before there is any external outlet. The fat appears to pass out from the cells of the coil to the surrounding tissue. As no sebaceous glands are present on the palms and soles, it has been suggested that the vernix caseosa has been produced by coil-glands.

Hairs.—The first change noticeable in the area which is to form a lanugo hair is a down-growth of the epithelium into the corium, occurring between the second and third months of fetal life, and situated about the forehead and eyebrows. From here these down-growths spread to all regions of the body, except the palms and soles. Between the fourth and fifth months, the hair itself begins to form in this early rudiment. By the sixth month, a lateral outgrowth from the hair-rudiment has developed into a sebaceous gland. Immediately beneath this is a small projection for the attachment of the fibers of the *arrectores pilorum*. When the hair becomes sufficiently rigid, it pierces the horny layer of the epidermis and makes its appearance on the surface. At about the seventh or eighth month, the lanugo hairs

begin to exfoliate and are replaced by new hairs growing out of the old follicles. This change is sometimes completed after birth. A very clear conception of the development of the hair as it occurs in the rabbit is quoted from MacLeod:

"A solid process of epithelial cells grows down from the epidermis into the underlying connective tissue of the corium; a small, vascular papilla of connective tissue forms below the down-growing process; the papilla increases in size, indents the fundus of the process, and from it a sheath of connective tissue spreads up to envelop the process and form a follicle; the axial cells of the process then become cornified and a hair is formed; the hair grows and finally breaks through the overlying epidermis, and the development is complete."

Sebaceous Glands.—The sebaceous glands appear first about the fifth month of fetal life as merely knob-like outgrowths of the hair rudiments, and are composed of cells of the same type. As they grow, they become pear-shaped, and have their long axes directed obliquely downward. The original process buds to form a number of saccules enclosed in a connective-tissue sheath continuous with that of the hair-follicle. From two to six glands develop in connection with each follicle.

PHYSIOLOGY OF THE SKIN.¹

The skin, through its various component parts, renders great service to the body as a whole through performing many physiological functions vital to life. Most important of these are protection, heat regulation, secretion, sensation, and respiration, the last-named only to a small degree. The skin is not simply an inert envelope in which the structures of the body are confined, but is a living organ comparable in importance to the liver, kidneys, and other similar organs.

Protection.—The epidermis is a poor conductor of electricity and light. In the tropics, where the light is greatest, the natives are provided with an increased amount of epidermal pigment to screen them from the light. Inhabitants of the temperate zone, while visiting tropical countries, require such clothing and shelter as will assist the epidermis in checking light-penetration.

The fatty matter in the stratum corneum prevents evaporation of the fluids of the body. The impermeability of the stratum corneum protects other organs of the body from the absorption of water and other fluids. Keratin is a substance which enjoys great power of resistance to chemicals of all kinds. Resistance to microorganisms which are normally present in the epidermis and to those also that are pathogenic that find accidental lodgment in the skin is provided by the impenetrability of the granular scales, their coherence, and the fatty matter present. The points offering least resistance to

¹ In the preparation of this chapter the following works were consulted: *La Pratique Dermatologique*, Tome I; Tigerstedt's *Physiology*, 1905; Duhring's *Cutaneous Medicine*, 1896, vol. i.

their entrance are the glandular orifices. In sweat-glands there may be an acid secretion (the sweat) exuding from a narrow, tortuous canal. The weakest point in the epidermis is the pilo-sebaceous system, where the sebaceous secretion, which is pasty and fatty, offers some resistance. The fibrous corium, by its strength and elasticity, with the loose, fat-containing subcutaneous tissue, acts as an ideal support and protective apparatus against external injury of the delicate nerves, with their special endings, the blood- and lymph-vessels, the glands and hair-follicles of these regions. The brain has an extra protection through the abundant hair-growth of the scalp.

Heat-Regulation.—In health, the temperature of the blood is maintained at nearly a given point, though the body be exposed to temperature changes of wide variation. This is accomplished, in the main, by the skin through radiation, conduction, and evaporation. When the body is overheated, either from external or internal causes, the blood is determined to the surface capillaries, with loss of heat by conduction and radiation; and at the same time increased activity of the coil-glands is stimulated, with outpouring of sweat, which by evaporation dissipates such heat. When the body is exposed to the cold, the cutaneous capillaries contract, sweat-secretion is diminished or stopped, and loss of heat is thus prevented. In addition, heat loss is lessened through contraction of the arrectores pilorum, which occurs when the body is chilled, by lessening the exposed cutaneous surface. The vasomotor system regulating the blood supply is intimately concerned in the phenomena above described, and apparently may act by direct excitation from without (heat and cold), or reflexly from within by fever, hot drinks, shock, drugs, etc.

Secretion.—The secretory function of the skin is carried on chiefly by the sebaceous and coil-glands. Their office is to furnish oil and moisture to render the skin soft and pliable, and, to a small degree, give off waste material. They play an important part in the temperature. The sebaceous glands secrete in health greasy and oily matter (sebum), which anoints the greater part of the cutaneous surface, including the hairs. The palms and soles are not anointed by this secretion, and they are the only parts which show the effect of water even after prolonged immersion. In the glands, sebum is a fluid or semifluid substance, which may be of firmer consistency in the ducts, and is, according to Starling, rather a wax than a true fat, and composed of fatty acids united with the stronger alcohols, including cholesterol. The expulsion of sebum from the glands to the surface is accomplished largely by contraction of the arrectores pilorum muscles which surround the sebaceous glands.

Sweat is composed largely (98 to 99 per cent.) of water. It is colorless, and has a specific gravity of 1003 to 1008. Its reaction may be acid, alkaline or neutral. It has an unpleasant odor and a salty taste. The odor varies according to the part of the body from which it is secreted. Under ordinary conditions it is acid, but after profuse perspiration its reaction becomes neutral or alkaline. The chemical

composition of sweat is difficult to ascertain, owing to the admixture with material from the sebaceous glands, which necessarily cannot be eliminated. The quantity daily excreted is variable and depends largely upon the requirements for heat-regulation. The amount in twenty-four hours is probably between a pint and a half and two pints. Urea is ordinarily present in very minute quantity, but in certain pathological conditions, such as uremia, may become appreciable in amount. While the entire skin secretes sweat, certain portions, such as the brow, face, neck, axillæ, genital regions, palms, and soles, are the chief areas of such activity. That there is a division of work between the skin and the kidneys in excreting water is shown by the light color of the urine in winter, when perspiration is at a minimum, while the urine is heavy and darker in color in summer, when the skin is actively secreting. The sweat-secretion is influenced both by reflex and central stimulation. The secretion is increased by elevation of the external temperature, by copious warm draughts, by certain drugs, such as pilocarpin, strychnia, camphor, ammonia, etc., and by such psychic phenomena as fright and anxiety. It is diminished by external cold and such drugs as morphin and atropin, and in certain pathological conditions, such as diabetes. The nervous centres for its regulation are located both in the medulla and spinal cord. The sweat-centres may be stimulated by venous blood caused by dyspnea preceding death, and reflexly by exciting the mucous membranes of the mouth with mustard and other condiments (Halliburton). While increased perspiration occurs as the result of vasomotor dilatation of the vessels in the skin due to heat or muscular activity, it may occur independently of this, as is shown in the psychic causes mentioned.

Absorption.—It is generally admitted that the intact skin is impermeable to water and other solutions. Normal fats, on the other hand, are absorbed to a certain degree, as well as chemicals incorporated in such fats. Advantage of this is taken in the treatment of syphilis by inunction. When the epidermis is removed, absorption may readily take place, and this fact should be borne in mind when making applications containing toxic agents to large inflammatory areas in which the stratum corneum has been removed.

Sensation.—This function of the skin provides a means of protection and discrimination. It was formerly thought that different sensations were awakened by various degrees and kinds of irritation applied to a single nerve-ending. Through the work of Blix (1833) and Goldschneider (1886), it is now known that there is a disassociation of sensation. There are different nerve-endings for heat, for cold, for tactile sense, and for pain.

Temperature-Sense.—There are scattered over the surface of the body certain points which convey only the sensation of cold, whether the irritation be electrical, mechanical, chemical, or by a hot or cold needle. There are other points which transmit only the sensation of heat. Where the tactile sense is most acute, as in the hand, the

temperature sense is diminished. The topographical areas of heat and cold must be studied from charts.

Tactile-Sense.—This sense is not equally distributed over the surface of the body. It is keenest in the finger-tip and the point of the tongue. It includes relative perception, with discriminations as to roughness, smoothness, hardness and softness, dryness and moistness. Relative perception is often an aid to vision. Pressure-sense is often increased by the presence of hairs.

Pain-Sense.—Where the surface is denuded of epithelium, it is not apt to receive other sensation than that of pain. Pain, too, is experienced from thermal, mechanical, chemical, or electrical irritation of severe character. There are nerve-terminals which receive no other impression than that of pain.

The nature of sensations of itching, tingling, and creeping has not yet been fully determined. Clinical observation suggests that one of the important factors in the production of itching is pressure on the epidermis. Any inflammatory or serous exudate occurring in just the right location to produce an outward pressure on the epidermis will cause itching. If the exudate is more deeply located, other sensations are experienced. Tingling and creeping sensations are apt to denote deranged innervation.

Respiration.—The respiratory activity of the skin depends on its permeability to gases and vapors, in which function it is accessory to the lungs. The manner in which this is accomplished is through a diffusion between the circulating blood in the capillaries and the atmosphere. Physiologically, oxygen is absorbed as well as some other gases. Water, carbon dioxid, and a trace of nitrogen are expelled. The respiratory function of the skin is not important and is far less in man than in amphibious animals (frog), whose skins are more like mucous membranes. The skin of these animals cannot be transplanted to man.

II. GENERAL SYMPTOMATOLOGY.

IN cutaneous, as in other diseases, the clinical signs or symptoms of a morbid process are those by which a disease is recognized alike by the patient and the physician. These manifestations are divided into subjective and objective: The former are those appreciated by the patient alone, in consequence of his sensations; the latter are those detected by the eye and the touch of another who undertakes the investigation of the disease. There are manifested to the eye and touch of the patient many objective signs which are liable to be interpreted or misinterpreted by him, with consequences not to be ignored. Some diseases of the skin have associated general symptoms, in which the cutaneous lesions are merely one expression of the pathological process. It is therefore necessary to study in detail not only those symptoms seen on the skin and described by the patient relative to the skin, but also to detect any departures from the normal in the condition of the viscera, and properly interpret these findings.

SUBJECTIVE SYMPTOMS.

The purely subjective symptoms of a disease of the skin are those manifested to the patient by sensations other than those connected with vision and his own sense of touch. They include sensations of itching, smarting, tickling, pricking, and burning; sensations as of increased or diminished susceptibility to the contact of foreign bodies; of increased or diminished temperature; pain in various grades of severity; and disordered sensations, such as those suggesting the crawling of insects over the part, the passing of currents of hot or cold vapors or liquids, and the compression of portions of the skin as by cords, bands, or closely fitting plates. The character of the subjective sensations experienced by a patient often proves an aid in recognizing the nature, not merely of a present disease, but also of one which has preceded. Thus, the sensation produced by an attack of erysipelas is rarely an itching, while the latter is highly characteristic of eczema and scabies; and the pain of zoster and the tingling of urticaria are distinctly different, not only from each other, but also from the subjective symptoms named above.

OBJECTIVE SYMPTOMS.

The study of the objective symptoms of a cutaneous disease is of paramount importance. It is only through a clear understanding

of these features that a correct diagnosis of a cutaneous disease can be made. These symptoms are spread before the eye, and their legibility increases with every hour of careful observation.

These signs of skin-disease are called "lesions" (efflorescences, elements of an eruption), and it is usual to classify them as primary and secondary (a number of which occur in each group). Such division, however, is open to criticism, since, in point of time merely, some of the so-called "primary lesions" of the skin become in turn secondary and even tertiary. Thus, a papule which might at one time be called "primary" may be transformed wholly or in part into a vesicle, which thus becomes a secondary lesion; and such vesicle again, in the evolution of a disease, may become a tertiary pustule, and the latter finally may result in a quaternary crust. In the following pages these symptoms of skin-disease are distinguished as elementary or primary and consecutive or secondary.

Elementary (or Primary) Lesions.—In describing the average size of cutaneous lesions it is less convenient to state their measurements in fractions of a line or of a millimeter than to convey an approximate idea by comparison with familiar objects of relatively fixed dimensions. The objects usually selected for this purpose, beginning with the smallest, are seeds of the poppy, mustard, and rape; the coffee-bean; the pea; the bean; the cherry; the finger-nail; the chestnut; the horse-chestnut; the egg of the hen and of the goose; the orange. To these may also be added the point and head of a pin.

Maculæ.—Maculæ (*spots, stains*; Fr., *taches*; Ger., *Flecke*) are generally circumscribed alterations in the color of the integument, differing in size, shape, hue, and duration of the dyschromia, and unaccompanied by elevation or depression of the skin-surface.

Maculæ may be congenital or acquired; and may be the sole cutaneous symptoms present in any case or be commingled with others. They may be transitory or permanent, few or numerous; as minute as a pin-point or as extensive as the integument covering a limb.

Maculæ may be due to arterial or venous hyperemia; to the escape of the coloring-matter of the blood into the skin; to acquired and congenital telangiectasis; and to pigment-anomalies. Examples of maculæ are to be found in the exanthematous rashes (measles); in localized hyperemia of the capillary plexuses of the corium, disappearing in various degrees according to the pressure exerted on the part (rosacea); in visible acquired development of blood-vessels in the skin (telangiectasis); in congenital vascularization of the surface (nevi); in variously colored blood-extravasations and stases (purpura); in stains produced by contact with dyes (hand-workers in anilin); and in pigmentary changes, such as those produced by solar heat (freckles) or by leprosy.

Extensive non-circumscribed changes in the skin-color are seen in the course of several general disturbances of the economy, as in yellow fever, cancer, chlorosis, albinism, Addison's disease, argyria, and icterus.

Spots of various color and device are also produced by the intentional or accidental introduction of pigmented particles beneath the epidermis, as by the process of tattooing or the explosion of gun-powder.

Maculæ exhibit a wide variation in color, from a rosy-pink to a chocolate-brown or even a black. This difference has suggested the employment of such descriptive terms as *roseola*, *erythema*, and *purpura*, which, unfortunately, serve to distinguish both the features of diseases and the diseases themselves.

A macule which encircles another lesion, as, for example, the halo around a vaccine vesicle, is called an *areola*. Linear hemorrhagic streaks are called *vibices*; punctate and larger extravasations of blood are termed *petechiæ* and *ecchymoses*.

Maculo-papules are elevated spots which approach the type of the papule.

Papulæ.—Papules (Fr., *papules*; Ger., *Knötchen*) are solid or compressible, ephemeral or persistent, circumscribed projections from the surface of the skin, varying in size from that of a poppy-seed to that of a coffee-bean.

These exceedingly common skin-symptoms vary greatly in their shape, color, location, career, and significance. Thus, they may be flattened at the apex, acuminate or pointed, conical, rounded, or depressed at the summit to form an umbilication; they may be pale, rosy, dark or lurid red, purplish, or even blackish; they may develop in transitory or persistent processes; they may be transformed into lesions containing fluids; may desiccate and furnish scales either at apex or base; may degenerate into ulcers; or may enlarge into tubercles or tumors; may be scratched, torn, or rubbed so as to lose their typical appearance; may come and go; may be sensitive to sudden changes in the blood-current, and yet be persistent.

The mixed forms described above are generally named *vesicopapular* or *papulo-vesicular*, *papulo-squamous* and *papulo-pustular* lesions.

Lesions which simulate the papule, and which, though described under that title, really belong to another category, are the small, semisolid elevations of the surface that form at the orifices of the ducts of the cutaneous glands and follicles. Thus, they may consist of little heaps of epidermis about the hair-follicles (*lichen pilaris*, *keratosis pilaris*), or of inspissated sebum collected in one or in all of the acini of the sebaceous glands (*comedo*).

The concomitants of an eruption of papular type also vary. Thus, there may be a febrile process, or extensive infiltration of the skin about and beneath the papules (*prurigo*), or itching of the most intolerable character (*eczema papulosum*), or production of trifling sensations of annoyance, as a slight burning without other subjective symptoms (*acne*).

Papules transformed into moist lesions become covered with a crust. Papules scratched or torn by the finger-nails usually betray

the fact in the minute and flat blood-crusts dried upon their surface. Papules which ulcerate may be followed by scars, and those which have undergone the process of involution may be followed by macular sequelæ.

Pomphi.—Wheals (*urticæ*; Ger., *Quaddeln*; Fr., *plaques ortiées*) are more or less transitory, pinkish, rosy-red and whitish, irregularly shaped and sized elevations of the surface of the skin, produced by blood-stasis in spasm of the vessels, accompanied by a tingling or a prickling sensation, and characterized by rapidity of evolution and frequency of recurrence.

The typical wheal is seen in the disease known as "nettle-rash" (*urticaria*), in which closely packed, shining, roundish, and whitish, pea- to finger-nail-sized elevations of the skin are visible, surrounded by a slightly rosy border. Wheals are firm to the touch, and arranged in patches, circles, bands, gyrations, or striations, often disappearing in a brief time and recurring with or without a renewal of the cause. They are occasioned by a rapid exudation of serum into the rete or pars papillaris of the corium. The sensations produced are stinging, prickling, and itching. Wheals are often surrounded by an areola.

"Giant-wheals" are such as have the dimensions of a hen's egg, or cover extensive areas of integument, as, for example, the entire surface of a buttock or a shoulder.

Relics of wheals which have disappeared are usually transitory erythematous maculæ, but in rare cases there is left a more or less deep pigmentation, which slowly disappears (*urticaria pigmentosa*).

At times the wheal-like condition is assumed by papillæ, as also by lesions resulting from such traumatisms as the bites of insects, reptiles, horses, dogs, etc.

Tubercula.—Tubercles (*nodules*; Fr., *tubercules*; Ger., *Knoten*) are circumscribed, solid, generally incompressible and persistent nodosities of the skin, varying in size from that of a coffee-bean to that of a cherry.

Tubercles occurring in diseases of the skin bear no relation to the lesions having the same name which develop in pulmonary tuberculosis. The dermatological title relates chiefly to the size of the lesion.

Tubercles may be projected largely from the free surface of the integument, or be deep-seated in the skin, and but a small portion become evident to the view externally. Their variations as to shape, color, size, slowness or rapidity of development, and other features correspond in great part with those described in connection with papules. They may be attached by a broad base to the skin, or be pedunculated, or even pendulous. Their seat is usually in the deeper portions of the corium or in the subcutaneous connective tissue. Degenerating and ulcerating tubercles are followed, as might be supposed in view of their volume, by considerable destruction of tissue, and correspondingly, in cases of repair, by extensive cicatrices. Tubercles are seen in such diseases as syphilis, leprosy, sarcoma, and cancer.

Tubercles are often described as merely enlarged papules, but the

distinction between these two forms of lesions will better be recognized when attention is paid to the particular portion of the skin in which each takes its origin. Many tubercles are pure neoplasms; others may be hypertrophies. Papules spring oftenest from the superficial layers of the derma; tubercles, from the deeper layers. At times a tubercle may project from the surface to a less extent than a papule, though its larger volume is evident as soon as the skin within which it has developed is palpated.

Tubercles due to a cellular infiltration may cease to be circumscribed, and by coalescence furnish a diffuse involvement of both the skin and the subcutaneous tissue.

Papulo-tubercles are transitional forms assignable to either of the two lesions named.

Phymata.—Tumors (*tumores*; Ger., *Geschwülste*; Fr., *tumeurs*) are masses of soft or solid tissue, or of solid tissue more or less commingled with fluids of variable consistency, differing in size, shape, color, and in the benignity or malignity of their career, located either within or beneath the skin, or, being attached to the skin, projecting from it to a variable extent.

Tumors may be formed of blood-vessels or of lymphatic vessels, or of both in the same lesion; may embody large, fluid-containing cysts; may be built up of nerve-tissue, fat, bundles of connective-tissue fibers, glandular elements, and, indeed, of any of the elements which exist anatomically in the human integument. Tumors vary in size from that of a walnut to masses of enormous volume and weight. They may be pinkish, reddish, brownish, or even black in hue, and may be covered with a tense or flaccid extension of the integument.

Examples of tumors are seen in fibroma, sarcoma, and carcinoma.

Vesiculæ.—Vesicles (*phlyctenæ*, *phlyctenulæ*; Ger., *Bläschen*) are acuminate, rounded, or flattened elevations of the superficial layers of the epidermis with limpid, lactescent, or sanguinolent fluid contents, varying in size from that of a poppy-seed to that of a coffee-bean.

Typical vesicles are seen in the minute, transitory lesions occurring in the vesicular form of eczema. They may be discrete, grouped, transitory, or for days persistent. They may be developed from papules. They are usually filled with a clear serum. Variations from this type, however, are common. Thus, they may be either flattened, acuminate, roundish, umbilicated, or conical; may be fully distended or partially collapsed upon their contents; may have a short or long duration; may be distended with a milky, chylous, or blood-stained fluid; may be opalescent, yellowish, reddish, or blackish in color; several may coalesce to form a many-chambered bulla. One or several may undergo transformation into pustules or bullæ. Vesicles may terminate by accidental or spontaneous rupture, their contents freely flowing forth upon the surface of the peripheral integument; or they may desiccate to a crust; or may even terminate by one of the ulcerative processes. They may or may not be accompanied by pruritus. Minute vesicles, which are merely the external apices of

large-chambered accumulations of fluid beneath, occasionally form upon the surface of the skin. Such are seen in the course of lymphangiectasis.

Vesicles are found typically in herpes zoster, herpes simplex, varicella, dermatitis herpetiformis, dysidrosis, and several other cutaneous diseases. Vesico-pustules and vesico-bullæ are intermediate forms of elementary lesions representing the types designated by these names.

Pustulæ.—Pustules (Fr., *pustules*; Ger., *Pusteln*) are circumscribed cutaneous abscesses, covered with an epidermal roof-wall, and varying in size from that of a millet-seed to that of a filbert.

The typical pustule contains pus, and is colored yellowish, yellowish-green, or brownish-green, according to the admixture of its contents with blood. The pus, being an inflammatory product, necessarily indicates the occurrence of an inflammatory process at the base of the pustule. Pustules, like vesicles, may be roundish, acuminate, globoid, conical, or umbilicated, and surrounded by an inflamed or normal integument; they may be superficial or be deep-seated; may terminate by rupture or by desiccation; may or may not be followed by an ulcer and ultimate cicatrix. They may be seated either upon the free surface of the skin, or at an orifice of a follicle, in which latter case they represent an inflammation with purulent product in the duct or the gland beneath.

Pustules may originate as such, or as a consequence of transformation of vesicles, or after a change in a papule, which may thus come to have a purulent apex. According to Auspitz, they invariably originate from vesicles. Pustules often result in the formation of crusts, the latter varying in color according as the pustules from which they originated contained clear serum or blood.

Transitional forms between vesicles and pustules and papules and pustules are termed, respectively, vesico-pustules and papulo-pustules. Pustules of a large size, resting upon an indurated, engorged, and elevated base, are often called "ecthymatous."

Pustules are seen in syphilis, variola, eczema, scabies, acne, and many other cutaneous diseases, including several forms of dermatitis medicamentosa. Many contain pus-cocci; some furnish a sterile or pseudo-pus destitute of microorganisms.

Bullæ.—Blebs ("*blisters*;" Fr., *bulles*; Ger., *Blasen*) are superficial or deep-seated elevations of the skin having fluid contents, differing in color, shape, and career, and varying in size from that of a coffee-bean to that of a goose-egg.

Blebs have been described as large vesicles. They may contain serum, lymph, blood, or pus, and may variously be colored according to the degrees in which their contents become visible through a semi-transparent roof-wall. They may be globoid, hemispherical, oval, crescentic, semicrescentic, or conical, and may even exhibit angles. They may be seated upon an apparently unaltered or an evidently morbid integument; and may or may not present a peripheral areola.

Bullæ may persist or may rupture; may desiccate or may degenerate

into ulcers; may collapse after the escape of their contents, and the roof-wall become glued to the base from which it was originally raised. Bullæ usually occur in extremely debilitated states of the system, and are, as a rule, of graver portent than other fluid-containing lesions of the skin. They occur in scalds and burns, in pemphigus, leprosy, erysipelas, syphilis, and moist gangrene.

Consecutive (or Secondary) Lesions. — **Squamæ.** — Scales (Fr., *squames*; Ger., *Schuppen*) are attached or exfoliated epithelial lamellæ which have become appreciable at the surface as the result of some morbid process in the skin.

There is constantly in progress over the superficies of the body physiological desquamation, the evidences of which are not pronounced in skins properly cleansed by ablution. In morbid processes, however, desquamation may occur as a distinct symptom in various forms. Thus the scales may be minute, fine, branny, dirty-white, or yellowish; they may be large, pearly-white, shining; may be dry or fatty; may be aggregated so as to resemble flaky pie-crust; may exfoliate in extensive sheets, as from the entire sole of the foot or the palm of the hand, or in glove-finger-like sheaths, as from the surface of a digit; they may be scanty, scarcely perceptible, and so firmly attached as to require force for their removal; they may fall spontaneously in a pulverulent shower, being so abundant as to encumber the garments or the bed-clothing of the patient.

Furfuraceous or pityriasic desquamation is that form in which fine, bran-like scales are shed from the surface.

Scales are frequently intermingled with other lesions, often succeeding the latter. Thus a papule may scale at its apex, or surround its base with a collarette of loosened epidermal plates, beneath or between which a macular stain is visible.

Again, scales may develop upon macules, tubercles, or tumors. Though generally conceded to be evidences of a dry and non-discharging disease of the skin, they are at times accompanied or succeeded by moisture of the part affected.

The term *scales* is sometimes applied to the flattened plates of dried sebum that form on the scalp and on portions of the trunk in pityriasis steatoides.

Scales occur in eczema, psoriasis, ichthyosis, syphilis, and in several of the parasitic diseases of the skin.

Crustæ.—Crusts ("*scabs*;" Fr., *croûtes*; Ger., *Krusten*, *Borken*) are relics of the desiccation of pathological products of the skin.

Crusts usually contain epithelial débris and scales, and may be compounded with loosened hairs and foreign particles. When formed by the desiccation of serum only, they are of a yellowish, straw-yellowish, or reddish-yellow hue; when composed largely of dried pus, they are colored greenish or greenish-yellow; and when there has been an admixture of blood they are usually brownish or blackish. At times they suggest in appearance gum, honey, or Venice turpentine. In shape they may have the form of the concavo-convex lid of a watch-

case; in color and shape they may resemble the half-shell of an oyster or the carapace of a small turtle. They may be delicate and thin, bulky and thick, friable or mealy; may be firmly attached to the subjacent tissues or readily separable; may cover a sound though tender and reddened epidermis; may conceal a superficial or a deep, foul-based ulcer, by secretions from beneath which they are raised above the plane of the skin and increased in thickness; they may be circumscribed and no larger than a small finger-nail; may envelop an entire limb or organ, as the leg or the penis; or, finally, may be so irregularly disposed among other lesions—papules, pustules, excoriations, and open ulcers—that it is difficult to define their outline, or even to recognize their identity. Crusts formed of dried sebum are greasy to the touch, dirty yellowish in shade, and usually seated upon a non-infiltrated base.

Crusts are common in eczema, syphilis, leprosy, impetigo, and in a large number of other diseases of the integument.

Excoriations.—Excoriations (*abrasions, erosions*; Fr., *excoriations*; Ger., *Hautabschürfungen*) are superficial solutions of continuity, usually involving portions of the skin affected with itching, and resulting from mechanical violence.

Excoriations, in appearance among the most trivial of skin-lesions, possess a value from the diagnostic point of view which can scarcely be overestimated. They occur as striated, linear, punctate, circular, or irregularly shaped, furrowed wounds, at times involving areas of flat surface, oozing with serum or blood, covered with dried blood or crusts, yellowish, blackish, or reddish in hue, and for the most part both induced and accompanied by severe itching. They may coexist with hyperemia and infiltration of the skin beneath, brought on by the irritative character of the continuous, or, more frequently, interrupted, cause by which they were begotten.

Excoriations become significant, depending upon whether they indicate scratching, tearing, or other species of wounding by the finger-nails, or the rubbing or piercing of portions of the integument with foreign bodies. In the former case they are significantly recognized in those portions of the body most accessible to the hands, though in the case of eczematous children and infants they may originate by the rubbing together of the knees, or the rubbing of one leg by the foot and toes of the other leg. The loss of tissue may extend deeper than the rete, at times invading the papillæ of the corium, which bleed in consequence. Scars rarely result from any save the deepest excoriations.

Excoriations may occur without the appearance of other lesions, as in the disease called pruritus; but where itching is severe and induced by a cutaneous exanthem, the lesions constituting the latter may be intermingled with, obscured by, or even obliterated by excoriations and the pathological processes to which they give origin. Thus, macules, vesicles, pustules, and papules may undergo change; and the recognition of the type of the existing disease may correspondingly be difficult. Excoriations are common in skins wounded by

lice, bed-bugs, and gnats; in the subjects of eczema, scabies, intertrigo, and prurigo; and in individuals with special sensitiveness of the integument to the action of a medicament employed either internally or externally.

Excoriations which occur after long-continued and persistent traumatism of the skin may be the seat of secondary infection with a purulent product, may become the seat of a severe inflammatory process, may be surrounded with a vivid halo of redness, may be seated upon a dense infiltration, and may result in deep pigmentation of the skin.

Rhagades.—Fissures (*cracks*, *rimæ*; Fr., *fissures*; Ger., *Hautschrunden*) are linear solutions of continuity, usually occurring in previously infiltrated portions of the skin.

Fissures may extend to the corium, and invade yet deeper structures; may be painful or the reverse; may be dry, secretory, or incrustated; are often hemorrhagic; and usually are formed with sharply cut walls. They are of frequent occurrence in the vicinity of the mucous outlets and the articulations, in which situations they are induced or aggravated by movements stretching or tearing tissue the extensibility of which has been diminished by any morbid process. Fissures may terminate in ulceration; they vary as to length, curve, and tenderness; they are often exquisitely painful, and greatly complicate the skin-disease in which they form; they may follow the curve traced by the boundaries of bodily organs near which they occur—as, for example, the line of the posterior junction of the ear with the head, or that of the breast of a woman with the thoracic wall upon which it rests.

Fissures occur in eczema, syphilis, and other diseases.

Ulcers.—Ulcers (Fr., *ulcères*; Ger., *Geschwüre*) are losses of substance resulting from a previous pathological process involving the corium, and in some cases the subcutaneous tissue.

Cutaneous ulcers differ greatly in size, shape, color, edges, base, career, and, indeed, in all their characteristics. Every ulcer has an outline, a base, a floor, edges, and a secretion. The outline may be circular, crescentic, reniform, ovoid, serpiginous, or with horseshoe-like contour. The base, or underlying tissue, may be soft, supple, indurated, or in a state of active inflammation, with consequent infiltration. The floor may be glazed, shallow, deep, excavated, cup- or funnel-shaped, "worm-eaten," crateriform, sloughy, covered with a tenacious or a readily removed secretion, granular, puriform, or hemorrhagic. The edges may be clean-cut, having a punched-out appearance, undermined, everted, ragged, irregular, or contracting, with a whitish inner border of advancing cicatrization. The secretion may be scanty, limpid, puriform, profuse, ichorous, and odorless, or exhale an offensive smell. Ulcers may be so crust-covered as to be invisible, or so exposed and erosive in action as to render the affected surface in the highest degree unsightly. They may be acute or chronic; insensitive or productive of intense pain; may heal by cicatrization, remain open for a lifetime, or prove fatal either by destruction of parts essential to life or by exhaustion of the vital forces.

Ulcers occur in syphilis, leprosy, lupus, and carcinoma. They occur on the lower extremities as the result of secondary infection associated with the congestion due to varicose veins; also in hypostatic congestion (bed-sores), and in cases of general debility with impaired resistance. Ulcers terminate after healing with cicatrization.

Cicatrices.—Scars (Fr., *cicatrices*; Ger., *Narben*) are connective-tissue new-formations replacing tissue lost through destructive processes involving the corium.

Scars never succeed excoriations, fissures, or other solutions of continuity in the skin that have not penetrated as far as the corium and resulted in destruction of a portion of the elements of which the corium is built up. They possess the highest importance for the diagnostician, since they point invariably to a pathological process the career of which is terminated, the characteristic features of which termination they frequently embody. They may be regarded as the special and persistent imprints upon the integument of the serious disorders from which it has suffered.

To a certain extent, as already shown, scars retain traces of the special peculiarities of the lesions, and even of the diseases, which they succeed. The identification, however, of the individual predecessor in each instance is, in the present state of our knowledge, not always possible from a study of cicatrices alone. The extent of knowledge in this direction, however, is rapidly increasing; and in many cases the certainty thus acquired is of incalculable value to the diagnostician.

Scars may be minute, punctate, or extensive in area, attached to the underlying tissues, depressed, or raised above the plane of the peripheral skin, seamed with furrows, pliable and soft, or indurated, traversed by ridges, knotted, or as irregular in contour as the ulcers already described. They may extend in digital, linear, or annular prolongations toward contiguous portions of the skin; and by subsequent contraction induce considerable distortion and deformity. Thus, they may drag down an eyelid, and ectropion ensue; may glue the lobe of an ear to the cheek; may evert the lip or nostril. When recent they are usually reddish in tint; when older they may be pigmented in the centre or at the circumference; or, as is common, may exhibit a gradual decoloration centrifugal in progress. They may be the seat of pain from an entrapped nerve-filament; may reopen to ulceration; or may be unaccompanied by subjective sensation. Not rarely they become the source of keloid. Scars are unprovided with hairs, papillæ, or the orifices of sweat-pores and sebaceous-gland ducts. As implied in the definition given above, scars may result from any disease or injury to the skin that involves loss of connective-tissue elements of the corium.

Unclassified Lesions.—To the several lesions defined above, Bazin adds, as elementary forms, the mucous patch of syphilis, the cuniculus or furrow produced in the skin by the *Acarus scabiei*, and the sulphur-colored crusts of favus. Among the elementary lesions of the skin,

Brocq includes the gumma, or firm, deeply situated, often subcutaneous mass commonly degenerating centrally rather than, as may the tubercle, from without; while among the consecutive or secondary lesions of the skin the same author considers "lichenization" or "lichenification." These are terms chiefly employed by French writers to designate the changes in the skin produced by long-continued external irritation, the thickened and infiltrated integument assuming a yellowish-brown or reddish-brown tint, the exposed surface being studded with pinhead, pinpoint, or slightly larger, shining and flattened isolated elevations, with delicate furrows separating each from the other. These, however, are not general, but special features of individual disorders, and are best studied in connection with the latter.

The elementary lesions of the skin are termed by Auspitz *anthemata*; groups of such lesions, *synanthemata*; and, in accordance with common usage, generalized eruptions affecting the entire surface of the body, *exanthemata*. The word *erythanthema* is used to describe groups composed of several of the elementary lesions of the skin, as, for example, of papules, vesicles, and pustules, rising from a common reddened and hyperemic base.

In addition to the names of the lesions of the skin just enumerated, certain peculiarities of cutaneous symptoms are described in qualifying terms which require definition. They relate chiefly to the color, shape, distribution, and method or period of evolution of lesions, as they are observed in individual cases. The more important of these terms, as used by modern writers, are alphabetically arranged below with a brief explanation appended to each.

- ABDOMINALIS. Located on the abdominal surface.
 ACQUISITUS. Acquired.
 ACUMINATUS. Having a pointed apex.
 ACUTUS. Of acute course.
 ADULTORUM. Occurring in adult years.
 ÆSTIVALIS. Occurring in the summer season.
 AGGREGATUS. Collected in patches.
 AGRIUS. Acute, or angry in appearance.
 ALBIDUS. Of whitish color.
 ANGIECTATICUS. Vascularized.
 ANNULATUS. } In the form of a ring.
 ANNULARIS. }
 APYRETICUS. Unaccompanied by fever.
 AREATUS. Occurring in areas.
 ARTIFICIALIS. Producing artificially.
 ASYMMETRICALIS. Of different distribution on the two lateral halves of the body.
 AUTUMNALIS. Occurring in the autumn.
 BRACHIALIS. Occurring on the surface of the arm.
 CACHECTICORUM. Occurring in debilitated subjects.
 CAPITIS. Occurring on the head, usually the scalp.
 CAVERNOSUS. Large chambered.
 CHRONICUS. Chronic in course.
 CIRCINATUS. Of circular outline.
 CIRCUMSCRIPTUS. Having a definite contour.
 CONFERTUS. } Arranged in close proximity, with coalescence of lesions.
 CONFLUENS. }
 CONTAGIOSUS. Capable of transmission by contagion.

- CORPORIS.** Occurring on the surface of the body; employed usually to designate an eruption upon the trunk, as distinguished from that on the head or the extremities.
- CRUSTOSUS.** Crusted.
- CRYSTALLINUS.** Of crystalline appearance.
- DIFFUSUS.** Irregularly disposed.
- DISCRETUS.** Having isolated lesions.
- DISSEMINATUS.** Disseminate; without regularity of distribution.
- ERUPTION.** Is used of the totality of all patches and lesions upon the person of one individual.
- ERYTHEMATOSUS.** Having a reddish blush.
- ESSENTIALIS.** Idiopathic.
- EXFOLIATIVUS.** Having a tendency to exfoliation or shedding of scales from the surface of the body.
- EXULCERANS.** Exhibiting lesions with a tendency to superficial ulceration.
- FACIALIS.** Located on the face, usually as distinguished from the scalp.
- FAVOSA.** Displaying crusts of favus.
- FEBRILIS.** Accompanied by a febrile process.
- FEMORALIS.** Occurring on the surface of the thigh.
- FIBROSUS.** Composed of fibrous tissue.
- FIGURATUS.** Having a figured appearance.
- FLAVESCENS.** Of yellowish hue.
- FOLIACEUS.** Resembling a leaf or leaves.
- FOLLICULARIS.** Concerning the cutaneous follicles.
- FUNGOIDES.** Resembling a fungus.
- FURFURACEUS.** Exhibiting numerous fine, bran-like scales.
- GUTTATUS.** Of the size of a drop of water.
- GYRATUS.** Having a serpiginous or gyrate outline, which is usually the result of a coalescence of imperfect circles or semicircles.
- HERPETIFORMIS.** Vesicular or herpetic in type.
- HIEMALIS.** Occurring in the winter season.
- HUMIDUS.** Accompanied by moisture.
- HYPERTROPHICUS.** Characterized by hypertrophy.
- HYSTRIX.** Having lesions projected or erected like quills.
- IMBRICATUS.** With crusts or scales overlaid like tiles.
- IMPETIGINODES.** Pustular.
- INFANTILIS.** Occurring in infancy.
- INTERTINCTUS.** Distinguished by color.
- IRIS.** Occurring in more or less distinctly defined concentric rings.
- LABIALIS.** Occurring upon the surface of the lip.
- LENTICULARIS.** Of the size of a small bean.
- LIVIDUS.** Deeply colored.
- MACULOSUS.** Discolored.
- MADIDANS.** Characterized by moisture.
- MARGINATUS.** Having a defined margin.
- MEDICAMENTOSUS.** Produced by external or (more commonly) internal medication.
- MELANODES.** Of blackish color.
- MILIARIS.** Of the size of a millet-seed.
- MITIS.** Of mild, benignant type—the reverse of agrius.
- MULTIFORMIS.** Exhibiting simultaneously several types of elementary lesions.
- NEONATORUM.** Occurring in the newborn.
- NEURITICUS.** Having nervous association.
- NIGRICANS.** Of a black or blackish color.
- NODOSUS.** With development of nodes or tuberosities of the surface.
- NUMMULARIS.** Of the size of small coins.
- OLEOSUS.** Accompanied by an oily secretion.
- PALMARIS.** Occurring on the palms.
- PARASITARIUS.** } Produced by an animal or a vegetable parasite.
- PARASITICUS.** }
- PATCH.** The aggregation of several isolated or confluent lesions.
- PHLEGMONOSUS.** Accompanied by deep-seated inflammation.
- PHLYCTENOIDES.** Characterized by groups of small vesicles.
- PIGMENTOSUS.** Accompanied by pigmentation.
- PILARIS.** Related to the hair.
- PLANTARIS.** Situated on the soles of the feet.
- PLANUS.** Flat.

POLYMORPHOUS. The Greek equivalent of the Latin *multiform*.
PRÆPUTIALIS. Situated upon the prepuce.
PROGENITALIS. Situated upon the exposed mucous surfaces of the genitalia.
PRURIGINOSUS. Accompanied by itching.
PUBIS. Located upon the skin or hairs of the pubes.
PUNCTATUS. Occurring in dots or points.
RHAGADIFORMIS. Fissured, or tending to produce fissures.
ROSACEUS. Having a rosy or pinkish hue.
RUBER. Red; usually dark red in color.
SCUTIFORMIS. Having the shape of a shield.
SEBACEUS. Concerning the sebaceous glands or their secretion.
SENILIS. Occurring in advanced years.
SERPIGINOSUS. Literally, creeping; advancing in irregular gyrations.
SICCUS. Dry; unaccompanied by moisture.
SOLITARIUS. Exhibiting an isolated lesion, or with isolated lesions.
SYMMETRICALIS. Similarly distributed on the lateral halves of the body.
TOXICUS. Poisonous.
UNIFORMIS. Exhibiting lesions all of one type.
UNIVERSALIS. Affecting the entire surface of the body.
URTICATUS. Accompanied by wheals.
UTERINUS. With association of uterine disorder.
VARIEGATUS. Exhibiting several distinct colors.
VASCULOSUS. Accompanied by vascular development.
VERNALIS. Occurring chiefly in the spring of the year.
VERSICOLOR. Exhibiting several shades of the same color.
VULGARIS. Of the usual or commonly observed type.

III. GENERAL ETIOLOGY.

SEVERAL features must be considered in the study of the causation of cutaneous diseases. A large number of the latter are simply expressions on the skin of a constitutional disease (the exanthemata: syphilis, pellagra, the xanthomata, and other diseases of this type). Others are purely cutaneous diseases, the entire process, including the cause, being limited to the skin (scabies, pediculosis, impetigo, and other parasitic diseases whose causative factor has been demonstrated). Still others, while purely skin diseases, have general conditions which contribute either to their cause or continuance (acne rosacea, seborrhea, eczema). Finally, many are cutaneous expressions of constitutional disturbances due to toxins other than those produced by a specific infection (acne, erythema multiforme, the purpuras, scorbutus, etc.).

A very important matter in relation to the general cause of cutaneous disease is the question of individual susceptibility. Of the many persons exposed to poison ivy, only a few develop a dermatitis venenata from such exposure; and a small proportion of these have their skins so sensitized that many and varied external and internal irritations will induce a subsequent dermatitis or eczema, that before the attack of the original trouble would have been inoperative. Idiosyncrasy has been the term employed to indicate this susceptibility from ingestion of certain drugs. The workers in anaphylaxis have thrown some light on this subject, but much more is needed. The fact remains that such susceptibility exists and must be taken into consideration.

Environment.—Environment is an important factor in the general etiology of cutaneous disease. Under this topic is immediately suggested the care or lack of care of the skin. Personal hygiene is very important, both directly and indirectly, as a factor in the production of skin diseases. Bathing, when overdone or employed insufficiently, often produces skin disease. In infants that are over-bathed intertrigo, eczema, and the like are often caused. The temperature of the water is important, as is demonstrated frequently in the excessive use of hot baths by young women, which is a factor in the production or aggravation of acne and seborrhea. The lack of bathing, as exhibited in public practice, predisposes to all parasitic diseases. It is a matter of common experience that pus-infection, some types of eczema, impetigo, and other diseases of this class occur much more frequently under these conditions. Poor air is indirectly a factor. This probably

produces its effect through the lowering of the general vitality, rather than by direct local action. In the crowded apartments of the lower classes, the lack of fresh air plays a part in all diseases, including those peculiar to the skin. Clothing plays its part through local irritation, when the material used next to the skin is either rough or poorly dyed. Again, when too warmly clad, the skin becomes tender, and therefore more liable to external and internal irritation. As a general rule, woollen clothing should not be worn next to the skin; cotton, linen or silk is preferable.

Occupation.—Many dermatoses are due exclusively to the occupations of men and women. The workers in dyes, in chemicals, and in drugs suffer in one way; the men who handle tiles, bricks, mortar, or clay in another; the baker, the confectioner, the cook, the laundress, the green-grocer, the seamstress, the shoemaker, the carpenter, and the machinist have each their forms of erythema, dermatitis, keratosis, or induration. Similarly, those whose faces are much exposed, as the wheelmen of vessels, tramcar-drivers, locomotive-engineers, and day laborers, exhibit symptoms in that region. Butchers, wool-workers, cattlemen, and sheep-shearers are liable to contract glanders, ringworm, or malignant pustule. Those who handle the bodies of the dead are prone to tuberculosis of the hands (anatomical tubercle), and those compelled to stand much of the time are exposed to the consequences of varicose veins of the legs and resulting eczema of that region. Finally, the dermatitis of the hands of laboratory workers produced by formalin, and of surgeons and nurses produced by the irritating substances used to cleanse the hands preliminary to surgical work, are of comparatively frequent occurrence.

Scratching is a potent factor in inducing and aggravating cutaneous disease. In pruritus, scratching frequently produces a traumatic dermatitis of varying grades. The aggravation of an eczema by scratching is a matter of daily observation. In this connection, other agents producing trauma with deleterious effects upon the skin should be mentioned, as the bites of insects, such as lice, fleas, bed-bugs; of animals, such as horses, dogs, and cats; and of serpents. In addition to the purely traumatic effect of all of these may be added the introduction of a toxic agent; and, finally, self-inflicted injuries must be recognized.

Food.—Food is another important factor, as many toxic erythemas, urticarias, and other angioneurotic disturbances are produced through errors in diet. This may be caused in several ways. Toxic substances formed in the food itself may be absorbed and be the factor. Reflex irritation from indigestible articles is the active factor in other cases. Idiosyncrasy is an important factor in still others where neither of the above plays any part. In searching for articles that commonly produce harm, the following should be inquired into: canned foods of all sorts, fish, lobsters, cheese, nuts, and strawberries. Medicine, while given innocently by physicians and taken also by patients of their own accord, is a very common factor in producing skin disease.

A reference to the chapter on *Dermatitis Medicamentosa* will demonstrate this fact. Most of the drugs, while capable of producing eruptions, do not produce characteristic ones. The iodids, bromids, and arsenic, however, are exceptions.

Climate and Seasons.—Certain diseases exist only or mainly in tropical countries. The list of exclusively tropical diseases is decreasing, however, and particularly during the last few years. Pellagra, hitherto practically limited to the so-called warm countries, has recently been fairly prevalent in the United States. Certain other diseases occur largely in or are made worse by cold weather.¹ In this connection, the seasons also play an important part. In winter, psoriasis, pruritus hiemalis, and certain types of eczema flourish; in the spring and autumn, erythema multiforme and pityriasis rosea are prevalent; while during the summer, dermatitis venenata, hydroa aestivale, certain types of eczema, dysidrosis, and sudamen are of frequent occurrence.

Heredity.—In certain diseases, such as ichthyosis, angioneurotic edema, xeroderma pigmentosum, congenital lymphoderma, keratoderma, and others, heredity is a factor. It is difficult to state whether some of these are hereditary disorders or are family diseases. It is uncommon to find xeroderma pigmentosum in different generations, but it is very common for several members of one family to be affected. On the other hand, ichthyosis apparently occurs in many generations, and in addition in several members of one generation. Keratoderma, on the contrary, may be limited to one member of a family, and yet examples occur where heredity seems to be important. In tuberculosis of the skin, a predisposition in certain families is assumed, but infection with the bacillus of tuberculosis must occur, though the soil may have been prepared by heredity. In very many other cutaneous disorders the influence of heredity remains a matter of opinion, which at present cannot be proven in either direction.

Race.—Very few diseases are prone to attack a single race. It is well known, however, that keloids occur often and grow to immense proportions in colored people, and that among these leucoderma is also common. Again, idiopathic multiple pigmented sarcoma is largely limited to the Jewish race. Most other disorders appear to occur without much selection as to race.

Age.—Infancy is characterized by the occurrence of congenital disorders, in addition to which several other cutaneous diseases are especially liable to occur. Among the commonest diseases may be mentioned the following: nevi, xeroderma pigmentosum, xanthomata, ichthyosis, epidermolysis bullosa, sclerema neonatorum, urticaria pigmentosa, ringworm (the small-spored variety), favus, lupus vulgaris, certain types of eczema, particularly pustular, and pus infections.

¹ Cf. Hyde: "On Affections of the Skin Induced by Temperature Variations in Cold Weather," *Chicago Med. Jour. and Exam.*, 1885, I, p. 187, and 1886, lii, p. 116; Corlett, *Jour. Cut. Dis.*, 1894, xii, p. 457, and *Jour. Amer. Med. Assoc.*, 1902, xxxix, p. 1583.

At puberty, acne, seborrheic dermatitis, and other sebaceous-gland disorders occur; while at a more advanced age epitheliomata are common.

Physiological State.—At the menstrual epoch, certain diseases are made worse, while others apparently occur only at that time. Eczema recurring regularly at this period is occasionally noted. Acne and rosacea may be aggravated. In pregnancy, herpes gestationis may occur, and if so recurs with each subsequent pregnancy. Pruritus, particularly localized in the genital region, urticaria, and chloasma are all apparently induced by this state. Other cutaneous disorders, such as acne and eczema, may be either aggravated or improved. At the menopause, pruritus and hypertrichosis not infrequently occur.

The relationship of cutaneous diseases to the so-called general disorders is a matter that has been studied much of late. Many generalizations are made. Specific connection between a general disorder or condition and cutaneous disease is rarely demonstrated. Xanthoma occurs with diabetes, as do also pruritus, both generalized and local, and genital eczema. That there is some connection between the gouty state and eczema there can be little doubt in certain cases. Again, urticaria is a fairly common accompaniment of malaria, and in rheumatism purpura is occasionally found. The extreme pruritus accompanying jaundice induced by hepatic disease is a matter of common observation.

Transmission of Infectious Diseases.—Infectious diseases with cutaneous manifestations are communicable from man to man, or from animal to man, in a variety of ways. Thus, transmission may occur by actual contact, either with the infected person or animal, or through an intermediate object, such as a drinking cup, roller-towel, or article of clothing. This mode of infection is an important factor in the spread of the tineas, a variety of tuberculosis of the skin known as the "anatomical wart," the acute eruptive fevers, lepra, and, most important of all, syphilis. Or it may take place through inspired air which has become infected by droplets of sputum from the respiratory passages of tuberculous patients, or by desquamation from scarlatina. In these last-named diseases ingestion of contaminated food, particularly milk, is a well-recognized mode of transmission.

Many diseases are transmitted by the medium of insects (particularly the fly, the bed-bug, the louse, the flea, and the mosquito), which attack the skin and deposit in the solutions of continuity which they produce bacteria or other noxious germs derived from foreign bodies on which they previously have alighted. In this connection, relative to diseases with cutaneous manifestations, may be mentioned Rocky Mountain spotted fever, transmitted by a tick; typhus, by the louse; and lepra, by the bed-bug.

Parasitic Diseases.—Under this title were once included solely the dermatoses induced by the presence of the animal and vegetable parasites. Among the former may be named scabies and pediculosis; among the latter, ringworm of the scalp and of the beard. But the

term "parasite" has acquired a much wider scope since the recognition of the microorganisms which have been demonstrated to be efficient in the production of a long list of cutaneous affections. Among these may be named the bacilli productive of cutaneous tuberculosis and of lepra; the pus-cocci, responsible for the several forms of impetigo and pustular eczema; and the streptococci, recognized in several forms of dermatitis. In most of the dermatoses which are recorded today as parasitic, germs have been recognized which, either singly or in coöperation with others, have been proved to be effective in the production of these disorders, or have been demonstrated to play an active part in either their extension or exacerbation.

The popular ideas respecting the frequency and danger of contagion in diseases of the skin are often erroneous. The non-parasitic affections are, and probably always will be, more numerous than all others. The danger of communicating scabies, syphilis, and other affections by handshaking is not as great as is generally believed. On the other hand, the dangers which by the mass of people are little considered are often the graver and more to be avoided. Among these may be mentioned the use of the public roller-towel, the drinking in common from public cups and glasses, promiscuous kissing, contact with the lower animals exhibiting diseases of the hide or fur, the wearing of a stocking on one foot which the day before was worn over the surface of a fellow-member, the seat of disease, and the wearing of velvet- or fur-trimmed collars on top-coats after the occurrence of a disease of the skin of that part of the neck with which the garment is naturally brought into contact.

IV. GENERAL PATHOLOGY.¹

THE pathological processes occurring in the skin are similar in many diseases to those occurring in other organs; but, owing to complicated structure and functions, the integument has a pathology peculiar to itself. Various pathological conditions, such as inflammation, hyperemia, anemia, hypertrophy, atrophy, degeneration, and neoplasms, are found in the skin, as in other organs of the body. Some diseases, such as the toxic erythemas, are merely cutaneous manifestations of an internal disorder which often exhibits no demonstrable internal lesions; in others, such as lupus vulgaris, the pathological and clinical manifestations are for the most part limited to the skin. Again, in diseases such as syphilis, similar pathological changes may be noted both in the internal organs and in the skin.

Bacteria.—The skin furnishes a habitat for a large number of bacteria, both pathogenic and non-pathogenic. From the normal skin may be collected a number of varieties of cocci, bacilli, and yeasts. Many diseases of the skin are demonstrably of bacterial origin, while others are probably due to specific microorganisms not yet recognized. Schizomycetes (tuberculosis, leprosy), streptotricheæ (actinomycosis), blastomycetes (blastomycosis cutanea), hyphomycetes (favus, "ring-worm") are all concerned in the production of diseases in the skin or its appendages. Animal parasites are responsible for several disorders (scabies, pediculosis).

Hyperemia.—Hyperemia in the skin may be active or passive, local or general, transient or persistent. On account of the conditions which may be associated with hyperemia, it plays an important part both in cutaneous and general pathology. Galloway² has emphasized the importance of erythema as an indicator of disease.

Anemia.—Anemia may be general or local. It is not a frequent factor in the production of cutaneous disease. Generalized anemia is a symptom of several diseases of the blood. Local, transient anemia occurs in urticaria and when cold is applied to the integument.

Inflammation.—Some of the many phases and pathological changes of the process recognized as inflammation are present in the majority of cutaneous diseases. Primarily, there occurs vascular dilatation, with leukocytic infiltration and exudation of plasma. The leukocytes,

¹ For a more complete discussion of the pathology of the skin, see MacLeod, *Pathology of the Skin*; Unna, *Histopathology*; Darier, *La Pratique Dermatologique*, pp. 67-136.

² *Brit. Jour. Derm.*, 1903, xv, p. 235.

attracted by positive chemotaxis to the point of irritation, either remove the offending material (microorganisms, etc.) by phagocytic action, or themselves are overcome, undergo fatty degeneration, and become converted into pus-cells. The chemotactic agent may be a mechanical, chemical, or thermic irritant, or its cellular products. The toxins of microorganisms may be effective. The plasma dilutes the toxins, and by depositing fibrin through the action of a ferment helps limit the process. Varying with the degree of the reaction and its attendant conditions, numerous secondary epidermal changes occur.

Histology.—The epidermis and corium, being unlike in development and structure, undergo different pathological changes.

The epidermis is composed of epithelial cells in various stages of evolution, from the columnar, nucleated, and comparatively highly differentiated cell of the basal layer of the rete mucosum, to the flat and lifeless external cells of the stratum corneum. A knowledge of the normal process of evolution of these cells is necessary to an understanding of the changes which necessarily must occur in morbid conditions when the normal course of evolution is interrupted by some mechanical, chemical, or other agency. Each cell progresses from the basal layer of the rete through the several strata above until it reaches the superficial part of the stratum corneum, having on its way passed through various stages and performed different functions. After completing its cycle of existence, it is finally cast off.

In the basal layer are situated the mother-cells of the epidermis. They are columnar in shape, contain nuclei and pigment, receive the termination of non-medullated nerve-fibrils, and have extending from them prolongations of protoplasm called prickles. As they progress upward through the rete, they become gradually flattened, no longer contain pigment (in the white races), and on reaching the granular layer are filled with granules of keratohyalin, upon the perfect formation of which depends the normal process of cornification. Farther up, the cells become homogeneous and lose their keratohyalin, but acquire eleidin in the stratum lucidum. In the lower part of the stratum corneum their nuclei disappear and a horny substance, termed keratin, is formed, to which substance this layer owes its hardness. Here also some fat appears. Still more externally, the cells become entirely flat and lifeless, and eventually are shed.

Hyperkeratosis—Acanthosis.—One or all of the layers of the epidermis may be involved in pathological processes, depending upon the character of the change and its cause. When there is overgrowth (hypertrophy), either local or general, of the stratum corneum, it is designated as a hyperkeratosis, examples of which are seen in keratoderma and ichthyosis.

By acanthosis (Unna) is meant a benign hypertrophy of the rete, in which the fibrillary structure of the cell is retained. Acanthosis occurs in all the infective granulomata, including syphilis and tuberculosis. Malignant hypertrophy of the rete occurs in epithelioma, in which affection the normal rete-pegs are not only enlarged and

elongated (acanthosis), but there are also rupture of the basal layer and irregular infiltration into the corium of epithelial cells, which lose their fibrillary structure and often become so changed as to resemble cells of mesoblastic origin.

Atrophy.—Atrophy of the cells of the epidermis occurs under various conditions. It may be caused by pressure, either external (as from a truss) or internal (neoplasm beneath the skin). It is found commonly in the senile skin, and is marked in cases of diffuse idiopathic atrophy of the skin.

Parakeratosis, Production of Vesicles, Bullæ, and Pustules.—Edema occurring in and between the rete-cells interferes with the formation of keratohyalin in the granular layer, causes the cells of the stratum corneum to appear swollen and moist and to retain their nuclei, and prevents the formation of keratin. This condition is termed "parakeratosis" (Unna), and is found in typical development in eczema and psoriasis. When the edema becomes greater, collections of fluid form, usually in the rete, and thus vesicles are produced. They are called "parenchymatous" when the early edema is intracellular, or "interstitial" if it be intercellular. Vesicles may be located superficially in the rete, as they usually are in eczema; or deeper, as in dermatitis herpetiformis; or beneath the epidermis, as occasionally happens in herpes zoster. Vesicle-formation is dependent not only on the mechanical separation of the cells by edema, but also upon the presence of toxic and other substances in the lymph, which may produce separation and disintegration of the epithelial cells, and thus leave spaces. Bullæ similarly are formed and located, and differ from vesicles chiefly in being larger. A typical bullous disease is pemphigus. When a large number of leukocytes collected in a chamber by chemotactic or other action have undergone fatty and other degenerative changes, the lesion becomes a pustule. When edema is long persistent, such as occurs when the leg is the seat of varicose veins, the epidermis is destroyed entirely and ulceration results.

Epithelial Degeneration.—The cells of the epidermis are subject to degenerative processes, the one most studied being of the "hyaline" type. This occurs in carcinoma and also in several other diseases, but is not, as once was believed, pathognomonic (see cellular degenerations of the corium). Degeneration occurring in epithelial cells exposed to *x*-rays, though not definitely classified, is pronounced and important. The nucleus as well as the cellular protoplasm is affected. The cell is swollen, stains poorly, becomes vacuolated, and eventually completely disintegrates and is carried away by leukocytic action during the period of reaction.¹

Fibrous and Cellular Structure of the Corium.—The corium is mesoblastic in origin, and is composed of fibrous tissue and cellular elements. The white fibrous bundles are called collagen, while the

¹ Scholtz, *Archiv*, 1902, lix, pp. 87 and 241. *Abstr. Brit. Jour. Derm.*, 1902, xiv, p. 397.

yellow elastic fibers are termed elastin. The cells found normally in the corium are connective-tissue, mast-, and vacuolated cells. As cellular pathology is so important in cutaneous disease, some knowledge of the minute structure of normal and pathological cells is important.

The common types of connective-tissue cells are large, spindle-shaped cells, which vary both as to size and shape. They have extending processes, which connect with those of neighboring cells. The nucleus is surrounded by a membrane, is usually either oval or round in shape, and is said to be *vesicular* on account of its open appearance, which is due to large spaces found between the chromatin threads. This open structure causes it to stain less deeply than the more compact nucleus of the mononuclear leukocyte, with which it is often confounded. In young connective tissue the cells are small and more or less oval, have a nucleus as above described, are surrounded by cell-protoplasm, and are termed *fibroblasts*. Other and less common varieties of connective-tissue cells are described by Unna as *plate-cells*.

Vacuolated cells of the corium have nuclei similar to those of ordinary connective-tissue cells. The cell-protoplasm presents spaces or vacuoles, but has no processes extending from it. On account of mitoses occurring in these cells, and because their apparent function is that of reproduction and not of evolution into connective tissue, MacLeod suggests that these may be the mother-cells of the corium, being thus analogous to the cells of the basal layer of the epidermis.

Mast-cells in the corium resemble other connective-tissue cells, but differ from them in that they contain a number of basophilic granules. They are discussed more fully in connection with the pathological cells of the corium.

Pathological Cells of the Corium.—Plasma-Cells.—Before Unna described the cell now generally recognized as the plasma-cell, at least two classes of cells were so denominated. The term is now restricted to cells which vary in size from that of a leukocyte to that of a cell two or three times as large. They are rounded or oval in shape and contain a large amount of protoplasm. The nucleus is usually eccentrically placed and corresponds in shape to that of the cell. It may be vesicular in appearance, or again several deeply stained masses of chromatin may be arranged about its border. Two nuclei are occasionally present. A cell having a similar nucleus, but containing a small amount of protoplasm, is found abundantly in tuberculosis, but is considered by many to be a lymphocyte. Plasma-cells are found abundantly in the infective granulomata, and to these cellular infiltrations Unna applied the term *granuloma*. Unna maintains that plasma-cells originate from connective-tissue cells, while Jadassohn, Councilman, Krompecher, Schottlander-Vmarschalko, and others believe that they arise from leukocytes. Krompecher, Vmarschalko, and others agree that these cells evolve into connective tissue, thus admitting the formation of connective tissue from leuko-

cytes.¹ Plasma-cells are studied best when stained with polychrome-methylene-blue (Unna), or Pappenheim's compound stain of pyronin-methyl-green. In the former, metachromatism is shown by the nucleus taking a blue color, while the protoplasm is stained a blue violet.

Giant-Cells occur in typical development in tuberculosis, but are found to a degree in syphilis, and cells resembling them may be noted in several chronic inflammatory diseases of the skin. The tubercular giant-cell may be round, oval, or irregular in shape, depending somewhat on its surroundings; as, for example, the presence of collagen, elastin, etc. They vary in size from two to three to many times the dimensions of a leukocyte. They contain nuclei which are similar to those of plasma-cells; and which may be arranged at one or both ends or sides, or completely around the periphery of the cell, and may number from a dozen or less to more than a hundred in a single cell. They stain deeply, thus making a contrast with the poorly stained centre of the cell, which presents a homogeneous protoplasm. As to their origin, several theories are advanced. One is that they are formed by the rapid proliferation of the nuclei in a single cell without corresponding division of the protoplasm. A second is that a number of cells surround some irritant, such as tubercle-bacilli, and coalesce, thus producing the multinucleated giant-cell. The question whether the giant-cell originally comes from connective-tissue cells or from leukocytes cannot be answered until the origin of the plasma-cell has been determined.

Mast-Cells occur to some extent in the normal corium, and are found in increased numbers in some diseases, including the infective granulomata, in which they are not specially significant. In urticaria pigmentosa, however, their increase is so marked as to be pathognomonic. They may be produced rapidly, as was demonstrated by Gilchrist,² who noted that they formed synchronously with an urticarial wheal. They may assume the shape of a connective-tissue cell, plasma-cell, or lymphocyte, and may originate apparently from any cell found in the corium. Their chief characteristic is the presence of basophilic granules in the protoplasm. Mast-cells of the corium correspond in staining reactions to Ehrlich's mast-cells of the blood, but it does not follow that those present in the cutis come from the blood. They are demonstrated best by stains having metachromatic properties, such as polychrome-methylene-blue (Unna), which stains the nucleus blue and the granules red.

Degenerations Occurring in the Corium.—Hyaline degeneration similar to that occurring in epithelial cells in carcinoma is found also in the corium in sarcoma, in rhinoscleroma, in syphilis, and in other

¹ For full consideration of the cells of chronic inflammation, including plasma-cells and mast-cells, the reader is referred to a critical review of the literature by Williams, *Amer. Jour. Med. Sci.*, 1900, cxix, p. 702; a series of papers by Pappenheim, and by Almkvist, *Monatshfte*, 1901-2; Maximow's monograph, *Ziegler's Beiträge*, Suppl. v, 1902; and a review of the subject by Whitfield, *Brit. Jour. Derm.*, 1904, xvi, pp. 7 and 63.

² *Johns Hopkins Hosp. Bull.*, 1896, vii, p. 140.

affections. It produces a homogeneous material in the cellular protoplasm, which is acidophilic in reaction, and, owing to its semifluid character, forms round globules. Hyalin is stained orange-red by Van Gieson's method.

Fatty degeneration occurs in several conditions in the skin, and is well represented in xanthoma. Here are found variously sized granules within a large cell, known as the xanthoma cell, which is characteristic histologically of the disease. This cell is the product of a connective-tissue cell in the multiplex varieties, while, according to Pollitzer,¹ in xanthelasma it results from degeneration of muscular tissue.

Mucoid degeneration is found in the "Mikulicz cells" of rhinoscleroma and in the lepra-cells of lepra. In both it occurs as a homogeneous mass, within which the specific bacilli are found.

Edematous degeneration occurs in the cells of the corium, which is the seat of marked edema. They appear swollen, stain poorly, and contain fluid. This form of degeneration is seen in tissue reacting after exposure to actinic and Röntgen rays.

Crenation degeneration is found in granuloma fungoides, and is evidenced by the cell becoming irregular and toothed. Eventually, the cell entirely disintegrates.

In addition to the cellular degenerations described above, several degenerative processes occur which affect the collagen and elastin.

Myxomatous degeneration, in which a peculiar jelly-like substance containing mucin results from collagenous degeneration, is found in sarcoma and myxedema. This substance is basophilic in reaction and is stained by any of the metachromatic dyes.

Colloid degeneration in the skin is comparatively rare. It occurs in the disease termed colloid milium. It consists of a homogeneous degeneration of the fibrous elements of the corium. The exact chemical composition of the colloid material is not known. It is stained yellowish-red by Van Gieson's method.

Other degenerations occur in the corium, in which collagen and elastin are concerned, and these are demonstrated chiefly by the staining methods described by Unna,² and are termed basophilic collagen, collastin, collacin, and elascin.

¹ Jour. Cut. Dis., 1897, xv, p. 367; N. Y. Med. Jour., 1897, lxxv, p. 679.

² Monatshefte, 1894, xix, p. 465.

V. GENERAL DIAGNOSIS.

THE establishment of an accurate diagnosis in cutaneous diseases is essential to their successful management. This statement is rendered necessary in this connection by the prevalence of a belief among the uneducated that the disorders of the skin, exhibited for the most part in visible symptoms, can safely be treated on general principles without a recognition of the nature of the malady. By many practitioners the demand for an accurate diagnosis is ignored in consequence of a too general impression that the desired end is to be pursued through great and perplexing obscurity. Yet with patience, method, a habit of careful observation (without which no physician is successful), and a reasonable degree of skill, both practitioner and student can, in the large proportion of all cases, attain their purpose.

It is a popular error that the sole requisite for establishing a diagnosis is the exhibition of an affected portion of the integument to the eye of him who is consulted with a view to its relief. The physician is supposed to inspect this surface attentively for a few moments, and then to pronounce definitely upon the nature of the disease present and the therapeutic measures to be adopted. While such a procedure is possible to the expert in a limited number of cutaneous disorders, in a large number of cases far more than this is requisite, and, indeed, is fully as essential here as in the investigation of disease involving any other organ of the body.

It is true that erythema, urticaria, dermatitis, eczema, purpura, alopecia, and many other affections of the skin may often be recognized after simple and brief inspection of the region involved; but the cause of such disorders and their relation to the general health of the patient, all of which knowledge is essential to their proper treatment, can be obtained only after a much more thorough examination. As a rule, it is desirable, first, to secure a history of the physical and mental condition of the patient in the past; then should follow the special history of the disorders of the skin; lastly, an examination of the patient and of the affected integument. The family history may be of value in making a diagnosis. For the purpose of methodically arriving at these facts, and of preserving them for future reference, they should systematically be recorded. The following are some of the points upon which it will generally be found useful to secure information:

The name, residence, age, sex, occupation, and married or unmarried state of the patient should be known, as also, whenever prac-

ticable, the health-history of parents and children. In the case of women, it is not only necessary to learn the history of the menstrual function in the past, but it is of the highest importance to be informed also as to the previous occurrence of abortions and miscarriages, and, if such have occurred, the order observed by these with relation to the birth of viable infants. The history of the products of conception has a most important bearing upon the question of syphilitic infection. The absolute exclusion of syphilis in any obscure case is a long step in the direction of an accurate diagnosis. In the instance of male patients, questions will usually elicit either admission or denial of the fact of a precedent or present venereal disease, and the answers should be regarded as valueless or trustworthy according as they are or are not substantiated by corroborative clinical facts.

Then should follow some record of the habits of the patient, as to active or sedentary employment, bathing, food, and drink, including under the latter term the use of beer, wine, and spirits. The history of any previous disorders, whether of the skin or other organs, should be satisfactorily clear, and the dates of occurrence, recurrence, and convalescence be at least approximately discovered. The patient should also make known whether he has had refreshing sleep; whether he has undergone mental anxieties (domestic, financial, etc.); whether he has suffered in his digestive, respiratory, circulatory, genito-urinary, or nervous system. Defects in elimination, assimilation, and nutrition should be noted; and when the symptoms suggest disease of other organs than the skin the patient should be subjected to the proper physical examination.

This much ascertained, the patient should be encouraged to narrate as succinctly as possible, and as far as may be in his own terms, the history of the present cutaneous disorder. A systematic series of questions put by the examiner should disclose, if possible: the cause of the disorder; its appearance when first seen, and any changes in character and type which have since occurred; the regions of the body affected, in order of involvement; the method of extension, by peripheral enlargement of the early areas, or by the appearance of new lesions at a distance from those first observed; the rapidity and regularity of the progress of the disease and its duration; the subjective sensations; and the influence of seasons and temperature upon the disorder. The treatment to which the disease has been subjected should then be detailed, this frequently furnishing a key to the diagnosis and therapy of the malady. In a large proportion of all cases, ignorantly directed and vicious internal or external medication has either begotten or aggravated the disease of the skin. This much ascertained, the physician is ready to examine the affected surface for himself.

During, however, the verbal interrogations which are required for this part of the exploration of the case, the watchful and observant practitioner will probably have secured for himself some useful information of which the patient is totally unconscious. Much of this is

difficult to describe, as it is the rich fruit of wide experience and careful scrutiny. With a gentle, courteous, and sympathizing manner the diagnostician must combine the art of a detective and the skill of a swordsman. Glancing occasionally at the face of his patient while making record of the answers given, he will, of course, have observed any eruption upon that portion of the body. He will have made a mental note of the temperament of the sufferer, and of any movement made by the latter indicating a tendency to scratch or rub portions of the skin. He will have noticed the posture, clothing, and head-apparel; the existence of hair on the scalp or extensive baldness; the condition of the exposed hands, as indicating manual labor or the reverse; and, in the absence of facial lesions, will have observed the special tint of the skin of the face, as suggesting anemia, chlorosis, or a general condition of cachexia. The facial expression, as indicative of anxiety or placidity, habits of debauch, sexual excesses, etc., will not have escaped his attention. All this and much more will possibly have enabled the questioner to direct his interrogatories into the channel in which they will elicit the most useful responses. The posture, cries, facial expression, and general condition of nutrition of the infant will have been no less carefully noted.

Proceeding to the examination of the affected integument, the physician must assure himself of a good light, as colors are best distinguished by daylight and artificial illumination should be reserved for exploration of the cavities of the body. The air of the apartment should be sufficiently warm to permit of exposure of the person without discomfort and without causing disturbance of the cutaneous circulation. Adult males and children of both sexes should have the clothing completely removed so that all portions of the skin may be inspected. One portion of the body may, however, be examined, and then covered if desired, while the examiner proceeds to direct his attention to another part. In the case of women the investigation should be conducted with the tact and delicacy to which the sex is entitled.

The examination, whenever practicable, should extend over the entire surface of the integument. The importance of this point can scarcely be exaggerated. It must be remembered that the physician should be much wiser than his patient, and the assurances of the latter are always to be accepted with reserve. Thus, one who merely exposes his leg, stating that this is the only part of his body affected, may have concealed beneath his clothing extensive varicosities of the veins of the thigh, a typical syphilitic exanthem over the abdomen, a significant scar on the elbow, an extensive patch of tinea versicolor on the surface of the chest, or a blennorrhagic discharge from the urethra, the medication of which has induced the rash for which he seeks relief. These are not the rare, but are the common, cases of a daily experience.

Observation should be had at this time of the general and special features of the eruption. As to the former, the following considerations should be borne in mind:

The original manifestations of a cutaneous disease may be masked or entirely hidden by the lesions resulting from scratching, or by a dermatitis due to local applications, or to drugs taken for the relief of the original disorder. It is of the greatest importance that the accidental nature of these symptoms be recognized, as they otherwise lead to great confusion in diagnosis.

Rarely a disease involves the entire surface of the body, leaving no part unaffected, and then is said to be universal in distribution; more frequently an eruption affects at one time several or most of the regions of the body-surface, and then is called generalized; much more commonly an eruption affects a considerable portion of but one or several regions, and is said to be diffuse; or it is limited to small areas of one or several definite regions, and is known as a local eruption.

A symmetrical eruption, one equally distributed over corresponding regions of both sides of the body, is rarely the result of an etiological factor operating upon the outer skin. It more often points to an efficient cause of internal origin. An eruption affecting the covered integument, never creeping out upon the exposed surfaces, suggests the operation of the clothing, as the latter may chance to prove the nidus or protector of a parasite, the fabric which has been colored by a noxious dye, the recipient of a chemically altered secretion which has proved irritating to the surface, the instrument of friction, or the source of increased temperature at the surface by its non-conductivity of heat and unseasonable thickness. An eruption accompanied by excoriations and scratch-lines is usually severest in the parts most accessible to the hands, and least developed where the latter have the least play, as over some parts of the back. An eruption limited to the hands is likely to be one induced by an agent to which the hands alone have been exposed. Such are the eruptions originating in the trades and domestic occupations; in the latter, an eruption more distinct on the right hand, and especially about the right thumb and index finger, tells its own story when the handworker is not ambidextrous nor left-handed. Artificially and intentionally produced eruptions, as in malingering, hysteria, mental depravity, and insanity, usually occur also in parts to which the right hand finds easy access.

Eruptions occurring on the face, the hands, and the genitalia of men, or on the face, hands, and mammæ of women, point to external contact or contagion (poison-ivy, scabies, croton-oil, etc.), since, next to the face, the hands are more commonly brought in contact with the parts named in the sexes respectively, as the wearing-apparel of each suggests.

An eruption limited to the forehead suggests an inspection of the hat-band, the veil, or the overlying false hair; to the ears of women, a glimpse at possibly cheap ear-rings; to the centre of the root of the neck, before or behind, a scrutiny of the collar-button and collar; to the anus of the baby, an inquiry as to the changing of its napkins; to the wrists of the adult, a question as to the cuffs worn; to the feet, information respecting gaiters, varicose veins, recently cut corns, and

ill-fitting boots. Eruptions springing from each of these causes have been treated long and vainly as "diseases of the blood."

Eruptions markedly asymmetrical are indicative of asymmetrically operating causes—that is, the accidents of environment, or else influences exerted within the body unequally on its two lateral halves. Thus, an orthopedic apparatus worn to correct talipes excites a dermatitis of the leg of the affected side only; and zoster of the trunk is evident on that side supplied by the intercostal nerve which has been inflamed. The greater stress may be laid on this peculiarity, as the law of symmetry, in eruptions not occasioned by causes operating on the outer skin, is faithfully observed in nature. The earlier syphilides, the quinin-exanthem, rubeola, and even lupus erythematosus, are remarkable illustrations of this fact.

Proceeding with the visible characteristics of the disorder, the physician will not fail to note an acuteness or chronicity of the eruption; also, the presence or absence of an exudate on the surface.

After obtaining an impression of the general features of an eruption the individual lesions should be carefully studied. The type of lesion (papule, tubercle, vesicle, etc.) should be noted. When the lesions are multiform the different types should be examined to determine, if possible, which are primary and which consecutive in appearance; which are essential and which accidental in the process. For the purpose of studying the characteristics of the individual lesions, those of most recent appearance (usually at the border of a patch), and as yet unmodified by scratching, treatment, and other influences, should be selected. Often, however, the full evolution of a lesion requires time, and its successive stages should be determined by observing a number of lesions of different ages.

The arrangement of lesions varies greatly in different diseases. When grouped such lesions may develop in circular, oval, angular, or irregular-shaped areas; or in circinate, gyrate, serpiginous, straight, or irregular bands and lines. In some affections (as ringworm, psoriasis, syphilis) the areas may become clear in the centre as the border progresses. Lesions may be grouped, and yet be discrete in that each lesion preserves its outline and identity; or they may coalesce so completely that all trace of the form of the individual lesion is lost.

The definition of lesions is another important diagnostic feature in which cutaneous affections vary greatly: the line dividing the diseased from the normal skin may be so sharp and fine that it can be traced with the point of a pin; or the lesion may shade so gradually into the normal skin that its outline cannot be definitely determined, and it is said to have poor definition or none.

The color of lesions of the skin often depends greatly upon circumstances having no bearing upon the disease in question. It thus varies with the natural color (light or dark) of the individual's skin, with the temperature of the surface, and with the amount of irritation to which the surface has been subjected by friction with rough clothing, scratching, treatment, etc. There are, however, some diseases (syphilis,

lichen planus, tinea versicolor, favus, and others) in which the color may be of great importance in the diagnosis, and there are many maladies in which consideration of this characteristic of the eruption is of value if the accidental modifications be borne in mind. The acuteness or chronicity of a disease is often indicated by the color of the lesions. The persistence, modification, or disappearance of color under pressure should be noted. For this purpose a small glass disk or glass tongue-depressor (diascope) is better than the finger.

In judging of the size of a lesion it is sometimes important to learn, by palpation, how much of it is above the general surface of the skin and how much is more deeply situated. In noting the shape of papules, tubercles, vesicles, and pustules, both apex and base should be taken into consideration. Thus, the apex may be pointed (acuminate), rounded (obtuse), flat (plane), or depressed (umbilicated). The base may be round, oval, angular, polygonal, or irregular.

The situation of lesions in or about the hair-follicles or at the opening of the ducts of the sebaceous or coil-glands is a diagnostic point of great value. It is important to know if certain lesions appeared first upon normal skin, or if they originated in other lesions. Thus, vesicles and pustules may arise from sound surfaces, or from the apices of papules or tubercles. The majority of even the elementary lesions are probably preceded by macules, which, however, are often so transitory as to be unrecognized and unimportant.

The career of an individual lesion, which often bears no relation to the duration of the disease as a whole, should be noted. Thus, the vesicle of eczema rarely exists as such for more than a few hours, though by the formation of new vesicles eczema may persist for months; while in zoster, individual vesicles last several days, though the disease as a whole is short-lived. In some diseases the type of lesion remains the same throughout its career unless modified by treatment or external influences, while in others the type changes or is complicated by other types. Thus, the papule may be modified by developing at its apex a vesicle or pustule. The career of lesions can usually be studied, not only by watching them from day to day, but also—and more easily—by observing at one time a number of lesions in various stages of development.

As the lesions of different affections vary greatly in their evolution and career, so do they in their involution. While in the majority of instances it is the recent and newly formed lesion that is most useful for purposes of study, there is often much to be learned from the manner in which lesions disappear and in the traces they leave. The papule or tubercle which ulcerates usually suggests (aside from some rare disease) syphilis, tuberculosis, or carcinoma, and may be sufficient to exclude from the diagnosis the possibility of psoriasis, seborrhea, and other superficial affections. In a doubtful case, the termination of some of the lesions in scar-tissue may be the one fact needed to make a differential diagnosis between seborrhea and lupus erythematosus, or between a circinate form of psoriasis and a similar

type of syphilitic eruption. Pigmentation sufficiently characteristic for a diagnosis is left after the otherwise complete involution of some lesions. This is most frequently true in zoster, lichen planus, and some forms of syphilitic eruptions. In estimating the time of involution of lesions and in making a prognosis regarding the disappearance of pigmentation (a point upon which patients are often solicitous), it should be remembered that pigment is usually removed very slowly from the lower extremities and other dependent portions of the body, and that in such localities it may persist for months or years after it has disappeared from parts in which the return-circulation is better.

Certain lesions have special features that should be studied. These are given in detail in the last division of the outline at the close of this chapter.

Before concluding his examination the physician will rupture a bleb, pustule, or vesicle, should such be found, to discover the nature of its contents. He will remove one or several crusts in sight, to expose the surface on which they rest. He will scrape away a few scales with the dermal curette for a similar reason. He will pinch between thumb and finger a portion of each part, in order to determine its infiltrated condition, its atrophy, or its attachment to the tissue beneath. He will pass his hands over the surface to recognize the firmness or the softness of the lesions, their inflammatory, hyperplastic, or neoplastic character, their dryness or moisture, and the existence of sebaceous or of perspiratory secretion. He will look at the mouths of the follicles where such secretion is retained or is abundantly exuded. He will discover any lice or their ova between or upon the hairs, any ascarides about the anus, any morbid formation of the nail or deformity of its matrix. He will examine for inguinal, post-cervical, axillary, and epitrochlear adenopathy, and will thus be often greatly aided in his task. A physical examination of the internal organs is often demanded. The mucous membrane of the mouth and throat frequently exhibits signs of past or present disease. Careful inspection should therefore be made of the tongue, the gums, the inside of the lips, the fauces, and the tonsils. A mucous patch here will often echo the story of a palmar or a plantar syphiloderm. The laryngoscope may be called for in syphilis, cancer, lupus, and leprosy. The degree of distention of the abdomen and the region of hepatic dullness should not be overlooked. The genitalia of men and of children and infants can usually be explored. For women unaffected with syphilis or disease limited to these parts an exception in this particular should usually be made.

In many cases the microscopical and bacteriological examination of hairs, scales, crusts, exudate, or tissue is essential to the diagnosis.

With the necessary reserve of all very obscure cases, it may be said that the physician who has conscientiously conducted an examination after the manner described above is in possession of the diagnosis for which he seeks. If the facts thus acquired have properly been recorded, and yet do not spell out such a diagnosis to his eyes, they will

probably be legible to others with a wider experience or riper judgment, to whom such a record may be shown. It is not claimed that this exhaustive method of examination is requisite in every case, as, for example, in order to recognize favus or to differentiate erysipelas from erythema. But it is certain that few obscure cases of skin disease will remain such under severe scrutiny, and the establishment of a thorough and exhaustive method of examination is important in the earliest experience with disease. Let the student or the practitioner conduct such an examination in the first few cases of eruption upon the surface of the body for which his advice is sought, and he will establish a habit of observation in comparison with which his pecuniary or professional success in the management of the same cases will indeed be of trivial worth.

Upon one special point should the inexperienced physician be guarded. It relates to the acceptance of a diagnosis which is *not* based upon such an examination as that given in outline above. A diagnosis by a patient is usually faulty, and the verdict of even skilled practitioners may be founded upon an error. The careful diagnostician should begin his task in a spirit of skepticism, and pronounce definitely only upon ascertained facts. The man who says he has an "eczema" may be louse-bitten; the woman who has been "overheated" may prove syphilitic. The patient recognized as suffering from ring-worm of the beard may not have been infected under the hands of a barber. Finally, the eruptions upon patients unmistakably syphilitic are often of other than syphilitic origin. These infected subjects—men, women, and children—are exposed daily to the accidents from which the non-infected suffer. They exhibit acne, physiological alopecia, and dermatitis medicamentosa equally with the non-syphilitic.

Tuberculin.—Three methods of administering tuberculin for purposes of diagnosis are now available: first, by giving hypodermatically Koch's old tuberculin; second, the "von Pirquet" tuberculin test; and third, the ophthalmo-tuberculin test.

Hypodermic Test.—Koch's old tuberculin is given preferably at midnight, beginning with one-quarter of a milligram (0.00025). The patient should have been prepared by being kept quiet for two days preceding the test and his temperature taken every two hours to determine the normal. If this be found to amount to 100 or more degrees the test should not be used. The reaction begins in from eight to twenty hours after the injection, usually in eighteen hours, and is indicated by a rise in temperature to 100, 101, or even 104 or 105 degrees. This is accompanied by severe headache, a feeling of general malaise, pain in the back and limbs, loss of appetite, at times nausea and vomiting, and, if severe, by grave prostration. As a rule, the symptoms subside in twenty-four hours, but may require two or three days to disappear. In addition to the general symptoms above recorded a local reaction is evident in the cutaneous lesion, exhibited by redness and other inflammatory phenomena. If no reaction occurs, a second dose of one milligram (0.001) is given in three days. If still

no reaction, a third dose of three milligrams (0.003) is given in another three days. If after this no reaction is evident, the diagnosis may be considered negative as to tuberculosis.

"Von Pirquet" Test.—This is practically a local vaccination method. Two solutions are necessary: first, a 25 per cent. solution of Koch's old tuberculin; second, a blank solution. Dr. Lincoln¹ suggests for the first solution one part tuberculin, one part 5 per cent. phenol in glycerin, and two parts sterile 0.85 per cent. salt solution. The blank solution represents one part 5 per cent. phenol in glycerin and three parts sterile 0.85 per cent. salt solution.

The arm is cleansed as in ordinary vaccination and one drop of each of the above solutions is placed on the cleansed area about two inches apart. Each is then scarified into the skin, with care not to make the surface bleed. Each drop is allowed to dry and is protected by a shield. In twenty to twenty-four hours the reaction, if it occur, is at its maximum and is exhibited as a hyperemic, sharply circumscribed, infiltrated lesion. There may be vesicle-formation, followed by crusting. In the area treated by the blank solution no significant change should occur. The reaction subsides in one to three weeks and is unaccompanied by constitutional symptoms.

Ophthalmic-Tuberculin Test.—A 1 per cent. solution of tuberculin is used. This may be prepared by adding one tablet of prepared tuberculin (to be had in the market, prepared for this purpose) to 1 c.c. of sterile 0.85 per cent. salt solution.

The eyes should be free from all evidence of inflammatory changes when the test is made. If found normal, one drop of the solution named is instilled into one eye. The liquid should be moderately warm and then evenly diffused over the conjunctiva by gentle manipulation of the lower lid. The reaction reaches its maximum in twenty-four to thirty-six hours and subsides in two days to one week, as a rule, and is exhibited as a catarrhal conjunctivitis. Usually no subjective sensations are present, though mild burning and smarting with photophobia may occur.

A positive reaction is indicative of tuberculosis in some region of the body, provided the eye has not been previously tested. It is important to note that tests repeated after five or eight days are valueless.

Serum Diagnosis of Syphilis (Wassermann Reaction).²—The complement-fixation test, as employed in syphilis, was first used by Wassermann, Neisser and Bruck.³ Its elaboration was made possible by the principles involved in the Bordet and Gengou reaction.⁴ This reaction, with the principles of hemolysis, must be understood to

¹ Lincoln, May C., Jour. Amer. Med. Assoc., 1908, vol. li, 21, 1756-1761.

² Fleischmann and Butler, Jour. Amer. Med. Assoc., 1907, xlix, p. 924; Butler, New York Med. Jour., November 30, 1907; idem., Jour. Amer. Med. Assoc., 1910, liv, p. 1114; Howard Fox, Med. Record, New York, March 13, 1909; Swift, Archives of Internal Med., 1909, iv, p. 376 (A Comparative Study of Serum Diagnosis in Syphilis).

³ Deutsch. med. Wochenschr., 1906, xix, p. 745.

⁴ Annales de l'Institut Pasteur, 1901, p. 289.

appreciate the phenomena occurring in the test as applied to syphilis. Special laboratory facilities are required and much experience is necessary to make the test reliable. Many factors are concerned and much time is required, which make its performance purely a laboratory function. To obviate some of the disadvantages, many modifications have been used,¹ but the major portion of workers employ the so-called original test rather than its modifications. Boas² uses a quantitative method, by which more accurate results are obtained. Five amounts of serum, ranging from 0.2 c.c. to 0.01 c.c., are used, and in addition practically all workers agree that more than one antigen should be employed.³ The principles and application of the test were early brought out in America by Fleischmann, Butler, Howard Fox, Noguchi, and others. The technique as employed by Dr. J. Frank Waugh is briefly outlined by him as follows (*Cf.* chapter on Diagnosis of Syphilis for discussion of practical value of test).

Five factors are used in performing the test: sheep's corpuscles, amboceptor, complement, antigen, and patient's serum.

The first known factor to be prepared is a 5 per cent. suspension of washed sheep's corpuscles. The sheep's blood is defibrinated as soon as withdrawn from the animal and is then stored in an icebox until the test is to be made. Corpuscles over forty-eight hours old should not be used. The amount of defibrinated sheep's blood used depends on the number of sera to be tested. One c.c., after being washed at least twice in normal-salt solution, added to 19 c.c. normal-salt solution, will make 20 c.c. of a 5 per cent. suspension, as the normal defibrinated sheep's blood is considered a 100 per cent. suspension.

The next step is to determine the titre of the amboceptor contained in the inactivated serum of a rabbit immunized against sheep corpuscles by the successive intraperitoneal injections of washed sheep's corpuscles. Usually five injections of 2 c.c., 5 c.c., 8 c.c., 12 c.c., and 15 c.c., respectively, at five-day intervals, will suffice, the animal being bled nine days after the last injection.

Into each of a series of test-tubes is placed 1 c.c. of the 5 per cent. suspension of sheep's corpuscles and variable amounts of the inactivated rabbit serum; an equal and sufficient amount of complement or fresh guinea-pig serum being added to each tube, in order that all the amboceptor present be utilized in the process of hemolysis. From 0.10 to 0.12 c.c. of guinea-pig serum is used in each tube in titrating the amboceptor. The tube in which hemolysis is just complete contains 1 unit amboceptor. By reversing the process, or placing 1 unit ambo-

¹ Noguchi, *Jour. Exper. Med.*, 1909, ii, p. 392 (A New and Simple Method for the Serum Diagnosis of Syphilis); Waugh, *Trans. Amer. Med. Assoc., Sec. on Derm.*, 1910, p. 193 (Results of Experience with Noguchi Modification of the Wassermann Sero-diagnosis Test for Syphilis); Howard Fox, *Jour. Cut. Dis.*, 1909, xxvii, p. 338.

² Die Wassermannsche Reaktion mit besonderer Berücksichtigung ihrer klinischen Verwertbarkeit (Harald Boas, Berlin, 1911, German translation); discussed by Fildes, *Brit. Jour. Derm.*, 1911, xxiii, p. 13 (The Wassermann Reaction).

³ Stillians, *Jour. Cut. Dis.*, 1913, xxxi, p. 316.

ceptor in each tube and variable amounts of complement, the titre of the complement is determined. Two units of each are used in the test. One c.c. of sheep's corpuscles, 1 unit amboceptor, and 1 unit complement constitute the hemolytic circle. When all are added to one tube, complete hemolysis results.

A number of antigens have been recommended by different serologists. The following preparations have proven to be the most satisfactory: an alcoholic extract of a luetic fetal liver, using Porges and Meier's¹ method of preparation; alcoholic extracts of normal organs, a human or beef heart or liver usually being used and prepared by Michaelis and Lesser's² method; a cholesterinized alcoholic heart or liver extract, as recommended by Sachs;³ and an acetone, insoluble antigen composed of lipoids from a beef liver, as advocated by Noguchi.⁴ After having been prepared, the antigenic properties of the different antigens are determined by careful titration, using both luetic and normal serum.

It should be the rule that the amount of antigen selected as a unit should be the amount which does not bind complement, even when the antigen is used in double quantity, which does not cause hemolysis, and which does not inhibit hemolysis when normal serum is used. One unit of antigen is used in the test.

The patient's serum is secured by withdrawing blood from a vein, permitting it to clot, and inactivating the serum at 56° C. for half an hour in a water-bath. Washed sheep's corpuscles as recommended by Jacobaeus are then added to the serum, which is placed in an incubator for thirty minutes, during which period the normal anti-sheep amboceptor, if present, will be taken up by the corpuscles. The serum is then centrifuged, pipetted off, and placed in the icebox. From 0.1 c.c. to 0.2 c.c. is used in the test.

All the material for the test having been prepared, test-tubes are numbered and placed in a suitable rack or holder. There should be at least five for each serum. Others can be added if desired, in which may be placed additional antigens, if more than two are used, or variable amounts of the serum to be tested, if more than two different quantities are desired.

In the first five test-tubes are placed 2 units of complement; in tubes one and three, 0.1 c.c. of the serum to be tested; in tubes two, four, and five, 0.2 c.c. of the same serum. In tubes one and two, 1 unit of antigen No. 1, and in tubes three and four 1 unit of antigen No. 2 is added. In the second group of five tubes a similar distribution of the ingredients is made, using positive luetic serum in place of the unknown. In the third group normal serum is placed as above described, the antigens and the complement being the same as in the

¹ Berlin. klin. Wochenschr., 1908, xlv, p. 731.

² Ibid., 1908, xlv, p. 301.

³ Ibid., 1911, xlviii, p. 2066.

⁴ Serum Diagnosis of Syphilis. H. Noguchi, 3d edition.

first two groups. Additional control tubes contain double the amount of antigens used in the test, with 2 units of complement.

The tubes are shaken to insure thorough mixing, then incubated for one hour. One c.c. of the 5 per cent. corpuscle suspension, 1 c.c. of normal-salt solution, and 2 units of amboceptor are then added to all tubes and the tubes again placed in the incubator. Hemolysis is usually complete within an hour in all tubes except those containing luetic serum and to which antigen was added; in these the corpuscles remain in suspension, which indicates a positive reaction. The final reading is taken several hours after the second incubation. The test is one of degree, depending upon complete or partial inhibition of hemolysis.

Luetin Test.¹—In 1911, Noguchi introduced another diagnostic test for syphilis, consisting of a cutaneous reaction similar to that devised by von Pirquet for tuberculosis. The material used in the test is termed "luetin," and is prepared by Noguchi as follows:

"Pure cultures of several strains of the pallidum are allowed to grow for periods of six, twelve, twenty-four, and fifty days at 37° C.; under anaërobic conditions. One set is cultivated in ascitic fluid containing a piece of sterile placenta, and the other in ascitic-fluid agar also containing placenta. The lower portion of each solid culture, in which a dense growth has occurred, is cut out and the tissue removed. The agar columns, which contain innumerable spirochetæ, are then carefully ground in a sterile mortar. The resulting thick paste is gradually diluted by adding, little by little, the fluid culture, which also contains an enormous mass of the pure organisms.

"The dilution is continued until the emulsion becomes perfectly liquid. The preparation is next heated to 60° C. for thirty minutes in a water-bath and then 0.5 per cent. tricresol is added. When examined under the dark-field microscope, numerous dead pallida per field may be seen. Cultures made from this suspension remain sterile and with it no infection can be produced in the testicles of rabbits. The suspension is kept in a refrigerator when not in use.

"In order to ascertain whether the reaction with this suspension may not be due to the introduction of antiseptic culture medium alone, it is necessary to prepare a similar emulsion, with uninoculated media, to be used for control purposes."

Technique of Application.—Noguchi recommends the injection of luetin in one arm, with the control material in the opposite arm. Several others have used both injections in the same arm. In either case, the proposed sites for inoculation are thoroughly cleansed in the manner ordinarily used in the preparation for a surgical operation. The luetin and the control emulsions are thoroughly shaken and the desired amounts of each are removed from the containers with sterile pipettes and diluted with an equal quantity of sterile salt solution.

¹ Noguchi, Jour. Exper. Med., 1911, xiv, p. 557: "A Cutaneous Reaction in Syphilis." Idem., Jour. Amer. Med. Assoc., 1912, lviii, p. 1163.

They are then placed in sterile graduated tuberculin syringes fitted with fine needles. An intradermic injection, consisting of 0.07 c.c. of luetin, is made in one area and a similar quantity of control material injected in the other. It is recommended always to make the injection as superficial as possible.

The reactions which follow are described by Noguchi as follows:

Normal or Negative Reactions.—In the majority of normal persons, there appears after twenty-four hours a small erythematous area at and around the point of injection, unaccompanied by subjective sensations. The reaction gradually recedes within forty-eight hours and leaves no induration. In occasional instances a slight yellowish pigmentation results from mild ecchymosis.

Positive Reactions.—Three forms are described: (1) A papular form, in which a large, raised, reddish, indurated papule, usually from 5 to 10 mm. in diameter, makes its appearance in twenty-four to forty-eight hours. The papule may be surrounded by a diffuse zone of redness and show marked telangiectasis. The dimensions and the degree of induration slowly increase during the following three or four days, after which the inflammatory processes begin to recede, and the color of the papule gradually becomes dark bluish-red. The induration disappears within one week, except in certain instances, in which a trace of reaction may persist for a longer period. (2) A pustular form, the beginning and course of which resemble those of the papular form until about the fourth day, when the inflammatory processes commence to progress. The surface of the indurated, round papule becomes mildly edematous, and multiple miliary vesicles occasionally form. At the same time a beginning central softening of the papule can be seen. Within the next twenty-four hours the papule changes into a vesicle, filled at first with a semiopaque serum, which later becomes definitely purulent. Shortly afterward the pustule ruptures; its margin remains indurated, and its surface becomes covered with a crust, which falls within a few days. With the fall of the crust the induration disappears, leaving no sequels. A wide range of variation in the degree of intensity of the reaction described in different cases has been noted. (3) A torpid form. In rare instances the injection sites fade away to almost invisible points within three or four days, so that they may be passed over as negative reactions. These spots suddenly light up again after ten days or even longer and progress to small pustular formations, the subsequent course of which is similar to that described above.

The papule above described is in most instances a comparatively deep-seated, inflammatory nodule, and is frequently surrounded by a bright-red areola, varying from half an inch or less to two or more inches in diameter. Constitutional symptoms vary. As a rule, a slight rise of temperature is present for one day. With a marked reaction, however, general malaise, loss of appetite, and diarrhea may occur.

The test is chiefly of value in chronic cases, being rarely positive

during the early and more active stages of the disorder. The reaction depends upon the hypersensitiveness induced in the system by the long-continued action of the *Spirocheta pallida*. In the early and active stages, where the Wassermann test is of most value, the luetin test is of little use; in the later and latent stages of the disease, where the Wassermann is liable to be negative and the disease still present, the luetin test becomes of value. Noguchi states that when syphilis has entered upon its chronic course, the direct demonstration of the *Spirocheta pallida* becomes difficult, if not impossible, the Wassermann reaction less frequently positive, and the clinical aspect less decisive. Here the detection of the allergic condition by the luetin test will be an aid in deciding the diagnosis in doubtful cases. As summed up by Foster,¹ a positive Wassermann test indicates the presence of metabolic substances in the blood serum, due to present or recent activity of numbers of spirochetæ on the tissues; while a positive luetin reaction is indicative of a state of hypersensitiveness to the specific proteins of the spirochetæ, induced by a period of cessation of the introduction of these proteins prior to the injection of the luetin.²

Method of Examination.—The following outline for the methodical examination of a patient affected with skin disease is based on the subjects considered in the preceding pages, and is given in such detail that a careful investigation of the questions suggested should furnish material for all but exceptional cases. For the average case much may be omitted.

The first attempts to follow such a scheme are necessarily tedious, and therefore often discouraging; but one patient thus carefully examined is of greater educational value than an aimless and indefinite examination of a dozen cases. There is no greater economy of time than is found in methodical and systematic habits of work.

HISTORY.

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| <p>I. NAME AND RESIDENCE.</p> <p>II. AGE.</p> <p>III. SEX.</p> <p>IV. MARRIED OR UNMARRIED.</p> <p style="padding-left: 20px;">1. Children.</p> <p style="padding-left: 40px;">a. Living.</p> <p style="padding-left: 40px;">b. Dead.</p> <p style="padding-left: 20px;">2. Abortions or Miscarriages.</p> <p>V. FAMILY HISTORY.</p> <p>VI. INDIVIDUAL HISTORY, <i>including that of previous skin diseases.</i></p> <p>VII. OCCUPATION.</p> <p>VIII. HABITS <i>of eating, drinking, bathing, tobacco-usage, etc.</i></p> <p>IX. PRESENT STATE OF HEALTH.</p> <p style="padding-left: 20px;">(<i>Note the condition of the digestive, respiratory, circulatory, genito-urinary, and nervous systems; also, defects in assimilation, elimination, and nutrition.</i>)</p> | <p>X. HISTORY OF PRESENT SKIN DISEASES.</p> <p style="padding-left: 20px;">1. Cause—if known.</p> <p style="padding-left: 20px;">2. Character at first.</p> <p style="padding-left: 20px;">3. Sites affected in order.</p> <p style="padding-left: 20px;">4. Manner of progressing.</p> <p style="padding-left: 40px;">a. Slow or rapid.</p> <p style="padding-left: 40px;">b. Steady or irregular.</p> <p style="padding-left: 40px;">c. With exacerbations and remissions.</p> <p style="padding-left: 40px;">d. With periods of entire freedom from symptoms.</p> <p style="padding-left: 20px;">5. Changes in character.</p> <p style="padding-left: 20px;">6. Subjective sensations.</p> <p style="padding-left: 20px;">7. Duration.</p> <p style="padding-left: 20px;">8. Effect of temperature and seasons.</p> <p style="padding-left: 20px;">9. Treatment to date.</p> |
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¹ Amer. Jour. Med. Sci., 1913, cxlvi, p. 645.

² For further discussion relative to the clinical application of the test, see chapter on Syphilis devoted to diagnosis.

OBJECTIVE SYMPTOMS.

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| <p>A. ACCIDENTAL COMPLICATIONS <i>due to scratching, treatment, etc.</i></p> <p>B. SITE.</p> <ol style="list-style-type: none"> 1. Universal. 2. Generalized. 3. Diffuse. 4. Local. (<i>Note influence of clothing, occupation, etc.</i>) <ol style="list-style-type: none"> I. Uniformity, or <i>multiformity</i>. II. Arrangement. <ol style="list-style-type: none"> 1. Isolated. 2. Grouped. (<i>Circinate, linear, etc.</i>) 3. Discrete. 4. Coalescing. 5. Irregular. III. Definition. (<i>Sharp, fair, poor, or none.</i>) IV. Elevation, or <i>depression</i>. V. Color. <ol style="list-style-type: none"> 1. Persistent. 2. Changing or disappearing under pressure. VI. Shape. <ol style="list-style-type: none"> 1. Apex. 2. Base. VII. Size. <ol style="list-style-type: none"> 1. Superficial. 2. Deep. VIII. Anatomical site. <p>C. SYMMETRY, or <i>asymmetry</i>.</p> <p>D. ACUTENESS, or <i>chronicity</i>.</p> | <p>E. MOISTURE, or <i>absence of</i>.</p> <p>F. INDIVIDUAL LESIONS.</p> <ol style="list-style-type: none"> 1. Elementary (<i>macule, papule, wheal, tubercle, tumor, vesicle, pustule, or bleb</i>). 2. Consecutive (<i>scale, crust, excoriation, fissure, ulcer, or scar</i>). <p>IX. Consistence. <ol style="list-style-type: none"> 1. Firm. 2. Soft. </p> <p>X. Base. <ol style="list-style-type: none"> 1. Color. 2. Infiltration. </p> <p>XI. Evolution. <ol style="list-style-type: none"> 1. From sound skin. 2. From other lesions. </p> <p>XII. Career. <ol style="list-style-type: none"> 1. Transitory. 2. Persistent. 3. Type. <ol style="list-style-type: none"> a. Simple. b. Changing. c. Modified. </p> <p>XIII. Involution. <ol style="list-style-type: none"> 1. Resorption. 2. Exfoliation. 3. Ulceration. 4. Atrophy, etc. </p> <p>XIV. Sequelæ. <ol style="list-style-type: none"> 1. Stains. 2. Scars. </p> |
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SPECIAL FEATURES TO BE OBSERVED IN CERTAIN LESIONS.

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| <p>A. VESICLES, PUSTULES, OR BLEBS.</p> <ol style="list-style-type: none"> I. Roof. <ol style="list-style-type: none"> 1. Tense. 2. Flaccid. 3. Easily ruptured. II. Contents. <ol style="list-style-type: none"> 1. Translucent, or <i>opaque</i>. 2. Serous. 3. Purulent. 4. Hemorrhagic. III. Surface beneath. IV. Areola. V. Involution. <ol style="list-style-type: none"> 1. Desiccation. 2. Rupture. 3. Crusts. <p>B. SCALES.</p> <ol style="list-style-type: none"> I. Size. II. Color. III. Quantity. IV. Consistence. <ol style="list-style-type: none"> 1. Dry. 2. Fatty. 3. Friable. 4. Tough. V. Attachment. <ol style="list-style-type: none"> 1. Firm. 2. Slight. | <ol style="list-style-type: none"> VI. Surface beneath. <ol style="list-style-type: none"> 1. Color. 2. Dry. 3. Greasy. 4. Hemorrhagic. <p>C. CRUSTS.</p> <ol style="list-style-type: none"> I. Size. II. Shape. III. Color. IV. Composition. <ol style="list-style-type: none"> 1. Serum. 2. Pus. 3. Blood. V. Attachment. VI. Thickness. VII. Consistence. VIII. Surface beneath. <p>D. EXCORIATIONS.</p> <ol style="list-style-type: none"> I. Distribution. II. Shape. III. Arrangement. IV. Relation to other lesions. V. Exudation. <p>E. FISSURES.</p> <ol style="list-style-type: none"> I. Distribution. II. Size. <ol style="list-style-type: none"> 1. Length. 2. Depth. |
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- III. Pain.
- IV. Moisture.
- F. ULCERS
 - I. Size.
 - II. Depth.
 - III. Contour.
 - IV. Base.
 - 1. Soft.
 - 2. Infiltrated.
 - 3. Indurated.
 - V. Edges.
 - 1. Sloping.
 - 2. Perpendicular.
 - 3. Punched.
 - 4. Ragged.
 - 5. Everted.
 - 6. Undermined.
 - 7. Soft.
 - 8. Indurated.
 - VI. Floor.
 - 1. Smooth.
 - 2. Uneven.
 - 3. Clean.
 - 4. Pus-covered.
 - 5. Granular.
 - 6. Sloughing.
 - 7. Hemorrhagic.
 - 8. Glazed.
 - VII. Secretion.
 - 1. Scanty.
 - 2. Profuse.
 - 3. Serous.
 - 4. Purulent.
 - 5. Hemorrhagic.
 - 6. Odor.
 - VIII. Pain.
 - IX. Crust.
 - X. Evolution.
 - XI. Duration.
 - XII. Involution.
(Note carefully the number and location of ulcers, the age of the patient, and the character of scars if present.)
- G. SCARS.
 - I. Size.
 - II. Shape.
 - III. Color.
 - IV. Depression, or elevation.
 - V. Texture.
 - 1. Soft, pliable.
 - 2. Hard, indurated.
 - 3. Thin.
 - 4. Thick.
 - 5. Smooth.
 - 6. Rough, corded.
 - VI. Attachment.
 - VII. Deformity.
 - VIII. Subjective sensation.
 - IX. Absence or presence of hairs, glands, and papillæ.

VI. GENERAL PROGNOSIS.

THE prognosis of most diseases of the human body is formulated with a view to the decision of the serious question of life or death. Occasionally this question arises in connection with skin diseases. Many of the latter are trivial, some are grave, a few are inevitably fatal in their termination. Thus, general exfoliative dermatitis, leprosy, sarcoma, carcinoma, at times lichen ruber, and variola in the unprotected are of grave portent; while the ordinary congestions and exudations, the great majority of all cases of acquired syphilis in adults, and the entirely curable diseases induced by parasites do not excite alarm in the breast of the average patient with respect to his longevity.

The questions, however, as to his future, which are urgently pressed by the victim of cutaneous disease, are both numerous and important. He is anxious as to the time during which he must suffer; as to the possibility of conveying the disease to his progeny or other members of his family; as to the disfigurement of his person that may result; as to the scars which he may carry for the remainder of his life; as to the possible recurrences of his malady in the future. The responses to these questions will largely depend on the prognosis of the physician.

Some diseases of the skin are acute, pursue a rapid course, and are prompt to disappear. Others are chronic, rebellious to treatment of the most energetic and skilful character. Others, again, though not shortening life, are never relieved while life is continued. Some disappear only to reappear at more or less regular intervals. There are cutaneous diseases which affect one individual but once in his lifetime; others which reappear at the instant the patient is again exposed to their exciting cause. There are cutaneous diseases so distorting and destructive in their effects that their victims have committed suicide under the influence of the morbid emotions which have been as a consequence experienced.

The mental distress occasioned by even an insignificant cutaneous disorder is often out of all proportion to its exciting cause, and this should always be regarded in establishing a prognosis. The sexual hypochondriac has been made insane by an acne; and the man or woman affected with syphilis has been made wretched for years by a recurrent erythema.

Again, a disease of the skin may coexist with grave lesions of internal organs, and the prognosis of the disease of the one be greatly

influenced by that demanded by the other; thus, there is occasional coexistence of syphilis and phthisis. Pruritus may be associated with albuminuria; and the eczema of an infant starving for want of breast-milk may hasten its marasmus to a fatal termination.

Upon the answers given to his patient inquiring as to the prognosis of the disease of the latter will largely depend the professional success of the physician. Scrupulous honesty should here be welded with all the skill that science can command. That a disease does not endanger life is not an argument in favor of its amenability to treatment. The practitioner should never suffer himself to be pushed by his patient to the position that an obstinate disease is readily manageable. It is the height of folly to estimate lightly herpes zoster of the forehead, for the reason that it is not infrequently followed by disfiguring scars. He who engages to relieve an alopecia areata in the month may have a year in which to repent his precipitancy. There is no way in which the conscientious physician can so readily secure the confidence of his patient, and with it that willingness to submit to appropriate treatment which is begotten of such confidence, as by demonstrating his ability to forecast the future of a disease; in other words, to describe accurately its prognosis.

VII. GENERAL THERAPEUTICS.

A CONSIDERATION of the subject of the methods of treating skin diseases in general suggests at once the intimate relation which subsists between the integument and other organs of the body. The etiology of one largely explains the causes of disease in all. The pathological processes in each are subordinated to the same general laws. The principles of treatment are very similar in all the disorders of the body.

The object to be attained by treating a cutaneous disease is, first, its complete relief; secondly, where relief is impossible, such management of the morbid process as will mitigate its severity and render the victim of the disease more comfortable. A higher and more scientific achievement than either is the prophylaxis by which man is enabled to escape the disease altogether. He can by his wisdom largely diminish the danger to which his integument is exposed; he can, to a certain extent, shelter himself from extremes of temperature, traumatism, toxic agents, and contagious diseases; he can, by observing the simple rules of hygiene, fortify his skin against the lesser evils which may befall it. Here, however, the subject under consideration involves disease which is actually present and in progress.

The management of diseases of the skin demands of the practitioner a sound knowledge of general medicine and an experience in disorders other than those of the integument. Dermatology is a branch of general medicine, and he who would succeed in the one department must at least be at home in the other. He who cannot succeed in the one field will almost surely fail to secure the best results in the other. Much indeed of the management of diseases of the skin can be correctly described as the pure practice of medicine. Many of the methods, most of the means of diagnosis, much of the pharmaceutical aid utilized by the general practitioner, are indispensable in the field of dermatology.

It is scarcely needful to set it down at this date that the old doctrines respecting both the danger of "driving in" certain diseases of the skin, and of the importance of "driving out" others, are relics of a superstitious ignorance. There is no disease of the skin the continuance of which offers a bar to other disorders or furnishes a guarantee of the future health of the patient. There is no disease of the skin which does not call for relief as promptly as the requirements and safeguards of science will permit. The retrocession of the exanthematous symptoms of a systemic poison is not of the class of involution of lesions to which attention is here directed.

In beginning the treatment of disorders of the skin it is scarcely necessary to repeat that the diagnosis should be established by the methods already detailed; and that in attempting to adjust remedies to the morbid state due attention must be given to the past history of the complaint, to its remote or immediate causes, to its duration, to the nature of the disease (whether the latter has changed in type or severity since the beginning), and in particular to the special features presented at the moment of instituting treatment. The matter of diet is one with respect to which experts are not as yet upon all points agreed. In general it may be said that in all inflammatory affections the diet should include food which is simple, digestible, and free from excess of proteins and carbohydrates. The diet appropriate for the gouty state in the majority of gouty patients suffering from dermatoses must be rigidly enforced, even admitting that too severe a regimen is to be deprecated for the gouty when not actually suffering from a crisis of the disease. In all attacks of urticaria the food permitted should be made to correspond carefully with the list of articles known to be incapable of aggravating the disorder; and too much importance cannot be attributed to the regulation of the food in infants and children affected especially with eczema. In glycosuric xanthoma, in the pruritus of albuminuria, in the tuberculoses of the skin, in acne cachecticorum, and in other disorders the selection of a dietary appropriate to the systemic state is of vital importance. On the other hand, it is to be conceded that in some cutaneous maladies, such as vitiligo, in the disorders due to vegetable and animal parasites, in molluscum, and in other affections which might be named, the subject of dietetics is without importance.

Like all other diseases of the body, those of the skin may be divided into three classes with relatively fixed limits.

The first class embraces all the diseases which have a natural tendency to pursue their course to a favorable termination. It includes all those affections which, either mild or severe, require absolutely no treatment of an active character. It is the duty of the skilful physician to watch the evolution of these maladies, and to discharge a most important part by refraining from therapeutic measures which in such cases might prove hurtful. By his judicious counsel, also, he hinders patients and their friends from pursuing a course which might prove prejudicial to the disease.

The second class embraces all those skin affections which are either inevitably fatal or hopelessly remediless while life is prolonged. Fortunately, this includes but a small proportion of the large list. Here the duty of the physician is plain. He should assuage pain, attempt to relieve deformity, administer to the comfort of the afflicted in other ways, and by his patient courage inspire confidence and hope. It must not be forgotten that the skill of man has not yet reached the acme of human need. In the presence of many diseases of the body he stands absolutely helpless, and the speediest way to success in such cases is to begin by an honest admission of the plain fact.

The third class of affections naturally embraces all not included in the first two named. Here disease may be prolonged or be shortened in its course, rendered acute or chronic, made more or less endurable, permitted to become inveterate, or absolutely be relieved by prompt and energetic measures, according as it is or is not judiciously and skilfully managed. Here are gained the most brilliant successes of the dermatologist; here also occur his most humiliating failures.

In the presence of a cutaneous disease which requires treatment the question naturally arises as to whether this treatment shall be *internal*—that is, by medicaments ingested; or *external*—that is, by local therapeusis; or by combination of the two methods at the same time.

Internal Treatment.—With regard to the question of internal treatment, which is one of pressing importance, it can safely be said that there is no remedy to be given by the mouth that can be described as certainly and specifically curative of the diseases of the skin. The number of medicinal agents employed with this end in view is incredibly large, by far the greater part being obtained from the vegetable kingdom. With few exceptions, some of which are enumerated below, the most esteemed of these agents exert only an indirect therapeutic effect upon the integument. The larger number of medicaments thus used are, it must be admitted, without value of any kind, but will probably continue to be vaunted as possessing specific virtue so long as credulity, on the one hand, and avarice on the other, move the mass of mankind.

Arsenic has long stood at the head of the list of remedies as valuable, when ingested, for the relief of cutaneous disorders. It is known to exert its effects almost exclusively upon the epithelia of the skin, and upon these, so far as therapeutic effects are concerned, only when they are the seat of subacute and chronic exudation. Upon the acutely inflamed epidermis the action of arsenic is unfavorable. If given for long periods of time, it may produce a generalized pigmentation and, occasionally, a generalized hyperkeratosis of the skin. It frequently produces excessive keratosis of the palms and soles, which in special cases has terminated in cancer of the skin. Operating favorably in this limited class of cases, it also operates slowly, requiring months for the production of its curative effects. Its administration is attended at all times with the hazard of producing toxic effects, which, however, when the result of the exhibition of the drug in medicinal doses, are limited usually to a mild exanthem upon the skin, moderate coryza, and some redness from congestion of the vessels in the eyes and eyelids.

Arsenic is used chiefly in psoriasis, acne, squamous eczema, pemphigus, and lichen ruber, its doses in case of children being relatively large. It should be administered only after eating, and a minimum dose first be employed in order to test the susceptibility of the patient to its action. It should be remembered that the toxic effect of this,

as also of several of the other drugs mentioned below, is often speedily noticed after the first exhibition of a relatively small dose. Toleration once established, the dosage may be cautiously increased.

The forms in which arsenic is usually administered are: arsenic trioxid usually dispensed in the form of tablet-triturations made up in different and most commonly administered doses; the liquor potassii arsenitis (Fowler's solution); the liquor arseni et hydrargyri iodidi (Donovan's solution); the liquor arseni chloridi (de Valangin's solution); and the Asiatic pill. Duhring's modification of this pill is obtained by making 2 grains (0.13) of arsenic trioxid and 32 grains (2.13) each of black pepper and licorice powder into thirty-two pills by the aid of a sufficient quantity of gum Arabic and water. Arsenic is also at times advantageously combined with other indicated medicinal substances, such as iron and potassium iodid.

An unprejudiced view of the value of arsenic, even in cases properly selected for its internal administration, justifies the conclusion that it is in diseases of the skin a remedy of uncertain effect, and in that proportion disappointing. After collation of the experience of experts, it has been shown that the common practice of giving arsenic in many cutaneous diseases is both harmful and irrational, not merely because of its effect in inducing cutaneous congestion and pruritus, but also because of the reliance placed upon it to the exclusion of other and better methods of treatment; and that the beneficial effects supposed to follow its administration are often due to other causes. No series of carefully recorded cases has ever been published in which notable therapeutical results have been shown to result solely from its administration. Even in pemphigus, psoriasis, chronic eczema, and lichen ruber, in which arsenic has been thought to possess special efficacy, it has in cases conspicuously failed.

It is safest to conclude, first, that arsenic, instead of being one of the earliest, should be one of the last remedies to be selected in the management of cutaneous diseases by the general practitioner; secondly, that, when thus selected, its value will probably prove greatest if the eruptive lesions be seated superficially, be generalized, diffused, or in evident association with neurotic symptoms; thirdly, that in any case its failure to relieve should not be regarded as definite if only Fowler's solution has been administered.

Sodium Cacodylate.—This drug is an organic compound of arsenic and may be used where arsenic is indicated. It is claimed for the drug that large doses may be used without irritating effects, whether exhibited hypodermically or *per os*. It has been found of value in the treatment of psoriasis, lichen planus, and dermatitis herpetiformis. The dosage should be smaller than commonly recommended, even though it has the reputation of being non-toxic. A safe quantity to begin with ranges from gr. $\frac{1}{30}$ (0.002) to gr. $\frac{1}{15}$ (0.004), given three times daily after food. The method most frequently employed at present is by intramuscular or subcutaneous injection of the drug, in dosage varying from $\frac{1}{2}$ gr. (0.06) to grs. $\frac{1}{4}$ (0.24) or more. Ampules

containing properly measured doses, sterilized and ready for use, may be obtained.

Atoryl (Meta-arsenious-anilide).—This drug has given brilliant results in syphilis, psoriasis, dermatitis herpetiformis, lichen planus, and pemphigus. It has been exhibited in dosage much greater than that in which other preparations can be given. Neisser has demonstrated its value in syphilis in apes. While it appears to be a preparation of great merit, it is not without danger, as untoward results recorded demonstrate. It is given hypodermically in doses up to three grains (0.2) once in three days. Great caution is recommended in its use.

Mercury is a remedy of great value in cutaneous as in other affections. Its specific action upon the liver and intestinal secretions calls for its employment in many cases in which intestinal elimination is deficient, in which there is habitual constipation, and in which there is a decided tendency to congestion of the blood-vessels of the head, of the anogenital region, and even of the lower extremities. In all of the distinctly gouty dermatoses, in all eczemas of the florid-faced type of patients, in many cases of intense pruritus resulting from toxic influences, and in almost all the eczemas of infancy and childhood, calomel, blue pill, and the gray powder are well nigh indispensable in securing the speediest and happiest results. Indeed, there are few adult patients seeking relief from a simple inflammatory affection of the skin and having at the same time a coated tongue, an offensive breath, and a loaded colon, who will not be benefited at the outset of treatment by free catharsis under the influence of a mercurial. In many cases, indeed, of aggravated types of engorgement of the skin, localized or generalized, a dose of blue mass may be given at night, on successive nights, or for a fortnight or more, and followed by a saline laxative in the morning, with the best effect upon the exanthem present.

Mercury in the treatment of syphilodermata is of incontestable value, and its injudicious employment in many cases springs from that precise fact. The vulgar prejudice that many disorders of the skin, really not syphilitic, are obscure manifestations of lues in a preceding generation and amenable to mercurial treatment, is a striking illustration of the necessity of accurate diagnosis in cutaneous diseases. When syphilodermata are present corrosive sublimate is often superseded, in consequence of its irritative effects, by the compounds of the metal with iodine. The gray powder is useful chiefly in case of infants and children, though its occasional development of the corrosive chlorid has limited its employment. Calomel and the mercurial pill should be employed only for transient effect, as when administered for long periods they are much more than the other preparations mentioned likely to produce ptyalism.

Iodine.—This drug and its compounds are chiefly used in syphilitic disorders of the skin, but they possess a wider range of value than the mercurials in the treatment of other cutaneous affections. Here,

too, the abuse of the drug furnishes a long list of cutaneous disorders either originated or aggravated by its employment. As in the use of arsenic, toleration should be established before large doses are exhibited. The compounds chiefly used are the iodids of potassium, sodium, lithium, and ammonium; iodo-nucleoid, iodipin, and iodoform. Iodin has been administered for the relief of the scrofulodermata, lupus, keloid, psoriasis, and syphilitic affections.

Cod-liver Oil.—This oil is a remedy of special value in diseases of the skin, and was for that reason held in high favor by the distinguished Hebra, though its action is almost exclusively that of a nutrient of the general system. It is employed chiefly for its roborant effects, which are similar to those of the digestible aliments. Its special value in the treatment of infants and children affected with cutaneous diseases cannot be questioned. It is, moreover, of great use in maturer years, and is advantageously exhibited in eczema, lupus and other tuberculous affections, syphilis, scleroderma, and in all disorders of the integument accompanied by wasting.

Cathartics, Alkalies, and Diuretics.—These have an important place in the list of remedies valuable in the management of skin affections. Cathartics are chiefly valuable in eliminating effete or toxic products, but they are effective also in reducing congestion of the body-surface. The value of mercurials in this connection has been already suggested. The saline laxatives and cathartics also are of great service, especially magnesium and sodium sulphates, and the Rochelle, Carlsprudel, and Hunyadi János salts. The useful and frequently ordered *mistura ferri acida* is compounded as follows:

R—Magnes. sulphat.,	℥jss;	45	M. (filtra)
Acid. sulph. arom. (vel dilut.),	℥j;	4	
Ferri sulphat.,	gr. viij;	50	
Aq. menth. piper.,	ad ℥iv;	120	

Sig.—A tablespoonful in hot or cold water before breakfast daily.

The alkalies are extremely useful in all cases of gouty disorder, and in erythema, acne, and certain forms of eczema. The carbonates of sodium, potassium, and lithium are chiefly employed, as well as the liquor potassæ. The prevalent misconception of the value of lithium carbonate and other salts of the same base has produced a reaction which suggests a preference for one of the other alkalies when such are indicated. Diuretics, with the exception of water, are less valuable in cutaneous than in other affections, but they yet are administered often with special advantage in inflammatory disorders.

Water.—Water when drunk in sufficient quantities and at proper times is of great value as a diuretic and as an aid to elimination. Soft water is to be preferred, and should be drunk freely at all times except during meals and for an hour after eating. The best results are obtained by drinking a given amount (four to eight, or more, ounces) every hour. As such a course is usually impracticable outside of hospitals and health-resorts, under ordinary circumstances two or three glassfuls may be ordered to be taken on rising in the morning

and before meals. The free use of water, especially if iced, with meals is a fruitful source of indigestion as a consequence of the chilling and large dilution of the stomach-contents. The vicious habits of rapid eating and imperfect mastication of food may often be corrected by simply abstaining from the drinking of liquids during the taking of food.

Quinin, administered both as a tonic and an antiperiodic, is largely employed in cutaneous medicine for its generally recognized systemic effects. It produces, in susceptible individuals, a peculiar smoothness and softness of the skin, which usually disappear when the drug is suspended. Like arsenic and iodine, it is occasionally the cause of a generalized exanthem, and is capable of producing other toxic effects, such as failure of the heart's action, dizziness, and tinnitus aurium, symptoms recognized under the designation of *cinchonism*. It will, of course, exhibit its happiest effects in malarial affections with coincidence of cutaneous symptoms, and in diseases of the skin associated with a neurosis. The value of the administration of the quinin muriate, in very large doses to the point of tolerance, in some forms of general exfoliative dermatitis is described in the chapter devoted to that subject.

Salol.—This is a remedy of special value in many cutaneous disorders associated with intestinal fermentation. It is particularly useful in the forms of pustular acne when the subject of the affection has an habitually coated tongue, a foul breath, and defective digestion. It is also of value in certain angioneurotic disorders induced by intestinal putrefaction, indicated by indicanuria.

Ergot and Ergotin, whether by exerting an effect upon the muscle-bundles or the vessels of the derma, or upon the uterus, or yet by influencing the general economy, are thought to possess some value in the treatment of several cutaneous diseases occurring in both sexes. Such are acne, purpura, and a few other disorders.

Calx Sulphurata.—This sulphur compound was once regarded as the most efficient of its group for internal use in cutaneous diseases. Its supposed value in furunculosis has led to its employment also in eczema, acne, and impetigo. It is given in doses of from $\frac{1}{10}$ (0.006) to $\frac{1}{4}$ (0.016) of a grain, three or four times daily. It is, however, a remedy uncertain in operation and of dubious effect.

Chrysarobin.—This drug has been administered internally by Stocquart¹ and others, in doses of $\frac{1}{4}$ (0.01) of a grain, for a number of cutaneous disorders.

Ichthyol, mentioned later as of some value when externally employed, has also been given by the mouth. It is administered in the dosage of 3 grains (0.2), three times daily, after meals. It is of value in acute lupus erythematosus and rosacea.

Jaborandi and Pilocarpin, probably as a result of the free diaphoresis which they excite, unquestionably exert immediate thera-

¹ Annales, 1884, s. ii, v, p. 15.

peutic effects in a number of cutaneous disorders, especially the angioneurotic group.

Sulphur, highly esteemed as a popular remedy in cutaneous affections, exerts but little influence upon the latter when it is ingested. Its cathartic effect is the chief reason for its administration. It is recommended by Crocker in some of the disorders of the sweat-function.

Antimony in small doses is of unquestioned value in many diseases of the skin. It is, when not contraindicated, employed with advantage in psoriasis, pruritus, and some of the obstinate forms of eczema.

Tar, Phenol, Creosote, Guaiacol, Resorcin, Turpentine, Copaiba, and Phosphorus.—These remedies have been employed internally with appreciable effect in certain cutaneous maladies. They have been used with advantage in cases of lupus, eczema, psoriasis, and pruritus; but the disagreeable effect of their internal administration has been to a great degree a bar to their general employment. The “perles” of phosphorus and the elixirs of the same drug obviate this difficulty in the instance of at least one of these articles. Creosote carbonate given in capsules is usually well tolerated.

Animal Extracts, Thyroid Extract.—These, and other preparations of the thyroid, adrenal, and other glands of the larger mammals, have in recent years been employed largely in various diseases of the skin. In myxedema decided and brilliant results have been obtained with thyroid extract, and it possesses some value in ichthyosis, psoriasis, and a few tuberculous affections of the skin. The irritating action of thyroid extract on the heart makes it an unsafe remedy to use except with caution.

Iron.—This metal and its several compounds are invaluable in the management of a long list of cutaneous disorders. Iron is indicated in many cases of cachexia and struma; in tuberculosis of the skin; in syphilis; in all the anemias; and in many cases of purpura and pemphigus. Fortunately, iron is often well assimilated when compounded with other drugs, and hence has been suggested the long list of compounds of iron and mercury and of iron and iodine in syphilis; of iron and quinin and of iron and the vegetable bitters in anorexia and anemia; and of iron with cathartics in atonic constipation.

Analgesics have occupied a small space in cutaneous medicine, and that space should be more and more restricted. The use of acetanilid, of opium and its alkaloids, of phenacetin, of potassium bromid, of trional, of sulphonal, and of articles of the same class, has been indicated for relief of the tormenting pruritus, pain, and insomnia accompanying a long list of dermatoses. Unfortunately, most of the preparations devised to insure relief, after a temporary calmative effect, have a decidedly aggravating influence upon the exanthem present. To a degree scarcely noticeable in other cases have drug-habits been formed in consequence of the temporary

assuagement of the local distress when under the influence of an analgesic. As a rule, the most competent physician is he who secures relief for his patient without narcotizing the nerves which are uttering their protest by abnormal sensation. The expert reserves for the last extremity medicines of the anodyne class in attempting to secure relief.

Hypodermic and Intracutaneous Injections of alcohol, arsenic, mercury, cocaïn, phenol, the alkaloids of opium, antitoxins, exalgine, of erysipelas-toxins, and other substances have been largely employed in the management of cutaneous disorders, some with marked success, others with doubtful results. The most brilliant of the achievements in this direction is without question the relief of the syphilodermata by deep intramuscular injections of mercury. The injection of the antitoxins,¹ which have been such a boon in an important group of general disorders, has, on the whole, proved disappointing in cutaneous medicine. Attention has been directed to the special objections, in most of the affections of the skin, to the use of anodynes and opiated medicaments by whatever route introduced into the system. The temporary alleviation, when secured, is gained at too great a cost.

Thiosinamin, Taurin, and other substances have been injected subcutaneously in the management of lupus, acne, eczema, psoriasis, lepra, and other affections. They have not as yet such an acceptance at the hands of the profession as would justify their employment in any save specially selected cases.

Opsonins.²—During the past few years opsonotherapy has attracted wide attention. In dermatology it is applied chiefly to infections induced by the staphylococcus and tubercle-bacillus. The chief disorders so treated are furunculosis, acne vulgaris, sycosis, lupus vulgaris, and scrofuloderma. Of those named above, lupus vulgaris seems most rebellious to the treatment.

The method was largely perfected by Wright and Douglas, of London. To be properly carried out much time and good laboratory facilities are necessary. The method essentially consists in injecting hypodermatically definite quantities of sterilized cultures of bacteria isolated from the affected patient.

It is proven that the serum of the blood contains substances which render bacteria susceptible to phagocytosis by the polymorphonu-

¹ See opsonins.

² LITERATURE.

Hektoen, L. Phagocytosis and Opsonins. Jour. Amer. Med. Assoc., 1906; xlv, p. 1407 (an excellent exposition of the subject with full references to earlier work).

Whitfield, A. The Opsonic Method in Skin Diseases. Translations of the Sixth International Derm. Congress, 1908, pp. 273-283.

Von Eberts, E. M. Bacterial Inoculation in the Treatment of Suppurative and Tuberculous Diseases of the Skin, after the method of Wright, 1908. Ibid., pp. 284-290.

Schamberg, Jay F., Gildersleeve, N., and Shoemaker, H. Bacterial Injections in the Treatment of Diseases of the Skin, 1908. Ibid., pp. 291-308 (with references and followed by discussion).

clear leukocytes. These substances Wright termed opsonins. The term is derived from a Greek word meaning "to prepare food," "to cook." As phagocytosis is the important feature in overcoming these infections, the quantity of opsonins becomes important.

For comparison in the work, the quantity of opsonins in a normal individual is denoted by 1. As a rule, in an infected patient they are reduced to 0.3, 0.4, 0.6, or 0.8; in other words, are less than normal (exceptions to this occur).

The opsonic index refers to the ratio between the amount of opsonins in the serum of an individual suffering with a bacterial infection and the amount in the serum of a normal, healthy person.

Wright says: "Vaccines are any substances that on being inoculated into the body will cause the generation of a protective substance." His vaccines consist of bacterial bodies.

Two difficult problems are presented: first, the determination of the proper dosage; and second, the time-interval between the injections.

Immediately following inoculation the amount of opsonins is diminished (negative phase). This period varies according to the size of the dose and other circumstances, and is followed by an increase and by a rise in the index (positive phase). By employment of sensitized organisms, the negative phase may be eliminated. After a varying time, the index begins to fall again but does not descend to its former low level. Therefore, by properly regulating the size of the dose and repeating it at the right interval, the amount of protective substances may be kept abundant, as indicated by a high index, and clinically by improvement in the symptoms.

The Preparation and Standardization of Bacterial Suspensions for Therapeutic Injection.—The size of the dose in the therapeutic injection should always be controlled by an approximate knowledge of the actual number of bacteria.

The method of standardizing the suspensions as originally devised by Wright is to be recommended.

It consists (1) of thoroughly mixing equal parts of an even, rather dense, bacterial suspension in NaCl solution and a known blood; (2) of making and staining a thin smear; and (3) of determining the relative number of red blood-corpuscles and bacteria in five or more fields under the $\frac{1}{12}$ objective. From this the number of bacteria per c.c. can readily be determined.

Example:—Suppose that in a given case the red blood-cells are five times as numerous as the bacteria. It is previously determined that the sample of blood used contains 5,000,000 erythrocytes per c.mm. Hence, the number of bacteria is 1,000,000 per c.mm., or 1,000,000,000 per c.c. If 50,000,000 are to be injected, one may inject $\frac{1}{20}$ c.c. diluted with b. s. NaCl sol.

Essentials in the Determination of the Staphylococcus Opsonic Index.—(1) An even suspension in NaCl of a 24-hour culture upon agar of the proper density. This is best obtained by suspending some of the

growth from agar slant and then centrifuging down the clumps. A 24-hour-old broth culture also answers this purpose.

(2) Washed leukocytes or washed blood for phagocytes.—Ten or more drops of blood are obtained from a prick in the ear and suspended in a 2 per cent. sodium citrate solution contained in and nearly filling an ordinary electric centrifuge tube. This is then centrifuged thoroughly until both the red and white corpuscles are thrown down. The citrate solution is now poured or pipetted off and normal NaCl solution added and the corpuscles suspended and then again sedimented. This is usually repeated once more. The salt solution is decanted and the top layer, containing a large percentage of the white corpuscles, is pipetted off and thoroughly mixed and placed in a small test-tube. This is designated in general use as the "washed blood," "washed leukocytes," or "blood cream."

(3) The Sera.—The "normal pool" of equal parts of three or more normal sera, as well as the patient's serum, is best obtained in small U-tubes from a prick of the finger or the ear. After five to ten minutes, when clotting has taken place, the clot is separated from the serum by placing the tubes in the centrifuge sockets and centrifuging for four or five minutes at high speed.

The method of obtaining the blood and mixing the three essential factors by Wright's method is complicated and requires not a little skill in preparing the necessary glassware. The method evolved in Hektoen's laboratory by the use of the simple tube and a small capillary pipette, which is bent at right angles, is simple as well as accurate. A special incubator is entirely unnecessary.

After mixing the pool of normal sera, a small amount is drawn up the capillary tube for a distance of approximately two inches. This point is marked with a glass pencil or a bit of India ink. A small bubble of air is drawn in the end. When the washed blood, and in like manner the bacterial suspension is drawn to the point marked above, in this way equal parts of the three necessary factors (the serum, the washed blood, and the bacterial suspension) are obtained and then thoroughly mixed by drawing them back into the wider portion of the pipette five or more times. The second pipette is now prepared. It contains the patient's serum, the variable factor. Both pipettes are then placed in the thermostat at 37° and incubated for fifteen minutes.

Smears are now made, after mixing thoroughly, and the average number of bacteria contained in at least fifty leukocytes determined. This indicates the relative opsonic power of the normal and patient's sera.

From this the opsonic index is determined by dividing the result obtained where the patient's serum was used by the result obtained where normal serum was used.

For example: If the count where normal serum was used shows that an average of four staphylococci was taken up per leukocyte and where the patient's serum was used shows five, the opsonic index of the former is normal or unity, that of the latter $\frac{5}{4}$ or 1.25. Any of

the polychrome blood-stains may be used to stain the smears. Two per cent. carbol-thionin solution in methyl alcohol is satisfactory.

The administration of vaccines today is largely regulated by the clinical effects produced, rather than by the complicated and tedious method above described. The principle of vaccine treatment is scientifically correct, but a definite technique has not as yet been clearly evolved. While brilliant results occasionally follow their use, they have, in the main, not accomplished the results which their early use promised in cutaneous diseases.¹

External Vaccine Treatment.—The local application of dead bacteria incorporated in ointment bases was first largely used by Gilchrist,² who reported his results, combined with those of several colleagues, including the author, at the XVII International Congress of Medicine. Towle³ at the same time was doing independent work along these lines. The method consists in the incorporation of the dead microorganisms in ointment bases, such as lanolin, vaselin, and cold cream, which are then applied on the affected areas in various cutaneous diseases. Acne vulgaris, eczema, eczematoid dermatitis, tuberculosis of the skin, and other disorders have been treated with varying success by this method.

Autoserum Treatment.⁴—Within the last two years, the injection of the patient's serum intravenously, subcutaneously, and intramuscularly has been practised with promising results. Pemphigus, dermatitis herpetiformis, urticaria, psoriasis, chronic eczema, prurigo, lichen planus, chronic ulcers, and other cutaneous disorders have been treated more or less successfully by this method.

Technique.—From 40 to 200 c.c. of blood are withdrawn from a vein at the elbow in the usual manner, by placing a constrictor on the arm above and introducing a platinum needle into the vein, and allowing the blood to flow directly into a centrifuge tube. Fordyce⁵ suggests the use of a MacRae needle attached to a large centrifuge tube as a means to facilitate the removal of the blood, which is done by producing a vacuum in the tube, thus causing a free flow. After removal the blood is allowed to clot. The clot is broken up with a glass rod, then centrifuged with a high-speed centrifuge for thirty to forty minutes, and the serum then injected intravenously in dosage varying from 25 to 60 c.c. Surgical cleanliness is absolutely essential throughout the whole procedure. Gottheil and Satenstein employ from four to six injections, at intervals of from five to seven days.

Spraying.—Spraying the skin for antiseptic purposes is of value, and may be often employed with marked advantage. The several

¹ Cf. Gilchrist, Trans. XVII. International Congress of Medicine, London, 1913, Sec. xiii, Part II, p. 405: Vaccine Therapy as Applied to Cutaneous Diseases (with discussion); Whitfield, *ibid.*, Part I, p. 193: The Vaccine Treatment of Skin Diseases.

² *Loc. cit.*

³ Jour. Cut. Dis., 1914, xxxii, p. 770.

⁴ Gottheil and Satenstein, Trans. Amer. Med. Assoc., Sec. on Derm., 1914, p. 124: The Autoserum Treatment in Dermatology (description of technique, personal results, and bibliography). Hilario, Jour. Cut. Dis., 1914, xxxii, p. 780: A Contribution to the to the Autoserum Therapy in Certain Diseases of the Skin.

⁵ Trans. Amer. Med. Assoc., Sec. on Derm., 1914, p. 135.

solutions of formalin are best suited to the purpose. Frigorific sprays for the purpose of freezing a part of the skin selected for operation, as in the case of epithelioma, are indispensable to the operator. Those chiefly employed are discharged from bulbs containing ethyl chlorid.

Natural Mineral Waters.—The chief value of many of the mineral springs and health-resorts of the United States lies in the change of manner of living that they invite and necessitate. Sunshine, pure air, recreation after the care and toil of business, change of climate, of foods and drinks, and even of cooks, often decide the question of speedy recovery. Unfortunately, both in America and in Europe, many of the health-resorts are peopled by unscrupulous charlatans, with a tendency to attribute all the benefits to be derived from these sources to the medicinal virtues of this or that particular spring, aided always by treatment according to their own peculiar methods. Many patients affected with disease of the skin are thus made worse by a temporary residence at noted health-resorts, and therefore it is often the case that a visit to the seashore, to the mountains, or to any healthful place in the country proves conducive to greater practical results. Nevertheless, the springs of America and Europe having mineral constituents in many instances supply a valuable means of treating cutaneous diseases. The sulphur waters of Richfield Springs, of Sharon Springs, and of Avon Springs, in this country, as of those of Europe, operate chiefly by an influence exerted upon the digestive tract. The springs of West Virginia are examples of calcic waters having for the most part a diuretic effect. The fine water of the Poland Spring in Maine is chiefly valuable by reason of its remarkable purity. The alkaline waters of Colorado Springs, of Saratoga, and of other sources in America are rapidly securing a reputation equal to that of the famous Vichy, Carlsbad, and Ems of Europe.

The chemical laboratories, however, are fast placing at the disposal of the consumer the salts, either natural or artificially produced, which represent the constituents of most of the mineral waters highly esteemed both here and abroad in the management of disease. In this way, the Apenta, Hunyadi János, Hathorn, Kissengen, Congress, Friederichshall, Rakoczy, and other waters may be produced at will by solution of the proper salts in water; and the latter in many of our large cities is now furnished after distillation and aëration in such purity that it competes with distilled water in the laboratory of the chemist and in the operations of the photographer.

Of the chalybeate and arsenical waters, the former abundant in Michigan and New York, the latter best represented by that of Levico, in the Austrian Tyrol, it may be said that their use is often followed by excellent results, especially when the drinking of the water is associated with the tonic regimen and healthful environment of the springs from which these waters are obtained.

External Treatment.—In the external treatment of diseases of the skin the indications are to hasten repair when this is possible; to alleviate distress, if palliatives only are admissible; to destroy abso-

lutely or excise the diseased tissue when this is justifiable. The following are the principal substances employed as external applications:

Water, either pure or medicated by holding substances in solution or mechanical suspension, is applied either in baths or as lotions. Baths, local or general, may be employed for days continuously or but for a few moments at a time. They are given with water varying in temperature—cold, warm, or hot. Rain-water is to be used when practicable.

Cold baths of short duration are generally followed by a sharp reaction, the skin becoming congested after the normal temperature of the surface is regained. It is for this reason that cold sponging of the inflamed skin is usually grateful so long as it is continued, and is succeeded by an aggravation of the symptoms which it was intended to relieve. Continuous applications of cold water are not open to this objection.

Hot baths are followed by a more or less enduring relaxation of the integument; while tepid water-baths are chiefly macerative of the surface. Hot baths are valuable in several of the exudative and hypertrophic affections of the skin. The application of watery lotions to the broken surface of the skin is likely to be followed by endosmosis, unless the specific gravity of the serum of the blood and that of the fluid of the bath or the lotion are nearly the same. This imbibition of fluids by the broken skin is accompanied by slight swelling of the tissues and is productive of disagreeable sensations.

The continuous warm water-bath, in which the patient is immersed either for the greater part of a day or for a few hours at a time, is an exceedingly valuable means of treating pemphigus, the severe grades of burns, and ulcerative affections of the skin.

The most perfect of all applications of water to the surface of the body is that most resembling the water-bath in which the tender skin of the fetus is immersed for consecutive months. Here the bath is continuous; the temperature is that of the viscera of the living animal; and the delicate skin of the unborn child is anointed with a fatty substance which interferes with the macerative action of the surrounding fluid so long as vitality is preserved at the average standard. The comfort and therapeutic value of a bath prepared and administered in approximation to this ideal can scarcely be overestimated. Were it not for the difficulties with which it is attended, so far as relate to many portions of the surface of the body, it would be possible with this single therapeutic measure to rob the exudative affections of the skin of many of their formidable features.

Vapor, steam, Russian, and Turkish baths are less valuable than is usually supposed in diseases of the skin. The macerative effect they produce is not always desirable. They possess some value in severe general pruritus, in ichthyosis, and in keratosis pilaris.

In acute inflammations of the skin the application of pure water, even when of proper temperature, is often prejudicial to the integu-

ment, and soap-and-water washings may prove quite harmful. The greatest caution must be exercised in giving instruction to patients as to the washing of the inflamed skin.

Water for external application, as in the bath, is medicated by the addition of a large number of substances, such as marine salt, boric acid, corrosive sublimate, sodium and potassium salts, alum, tannin, the mineral acids, gum Arabic, gelatin, and bran.

The alkaline bath, made by adding sodium bicarbonate or biborate to water having the proper temperature in the proportion of 12 ounces of either salt to 30 gallons, is usually grateful to the inflamed skin. Sulphur-baths are best prepared by adding an ounce of Vlemineckx's solution¹ to the above-mentioned quantity of water.

Baths.—*Sulphur-baths.*—The natural sulphur-baths of Richfield Springs and Avon Springs, in this country, are efficacious in certain cutaneous affections accompanied by roughness and thickening of the integument.

Tar-baths.—Tar-baths are usually given by first anointing the skin of the patient with the tarry substance to be employed, and by immersing the body in warm water for some hours afterward. The resulting effect can usually be accomplished as well by other measures.

Salt- and marine-baths possess the highest value with respect to the general health of the individual; and are advantageously employed over the body-surface when, for example, the head alone is affected with a dermatosis (rosacea, acne, erythema), and when the salt is not brought into contact with the morbid surface. In very many cases a sea- or salt-bath produces aggravation of a cutaneous affection, and, indeed, in some cases, is capable of begetting the same. A properly directed salt-bath or lotion, however, is at times positively beneficial, not merely in chronic, but also in acute affections of the skin.

The strength of the usual marine salt-bath is $\frac{1}{4}$ pound to the gallon, though 10 pounds of the salt are often added to 25 gallons of water with advantage. The sea-salt is not preferable to the article obtained from the natural brine-wells of the interior of the country. For invalids the skin of the body may first be well rubbed with the finest table-salt, well warmed in an oven, after which a tepid or warm bath may be used to cleanse the surface.

Antiseptic-baths.—These baths are most often employed by the surgeon. In the management of skin-affections local baths of boric acid in hot or cold water may be employed. The acid is soluble in about 25 parts of cold water. Corrosive-sublimate baths are employed in the strength of 1 drachm (4.) of the mercurial to 30 gallons of

¹ The formula is:

R—Calcis,	℥ss;	16	
Sulphur. sublim.,	℥j;	32	
Aq. dest.,	℥x;	320	M.
Coque ad ℥vj [200] deinde filtra.			
Sig.—"Vlemineckx's Solution."			

water. Local baths thus medicated are often employed in the cleansing of ulcerated and suppurating surfaces with a view to subsequent dressing.

When employed as a lotion, water is made to produce a sedative effect by the addition of opium, belladonna, glycerin, phenol, hydrocyanic acid, zinc, bismuth, mercury, lead, and alkaline bicarbonates and with sodium biborate. It is rendered stimulating by the admixture of alcohol, most of the acids and alkalies in stronger solution than in the soothing or sedative lotions, and also by a large number of substances which operate upon the surface either mechanically or chemically. Water is also rendered astringent when tannin, lead, and similar medicaments are dissolved in it; and by its union in various proportions with soaps and alkalies a solvent effect is produced either upon the cuticle itself or upon pathological or foreign products upon its surface.

Soaps.—Soft soap (*sapo viridis*, *sapo mollis*), made by the addition of caustic potash in an excess of between 3 and 4 per cent. to an animal fat, is a substance exceedingly useful in the treatment of skin diseases. It is used for the purpose of producing either a deterative or stimulating, and at times a slightly destructive, effect either upon the surface of the skin itself or upon pathological accumulations upon the surface (crusts, scales, etc.). It may be used as a plaster or with water; and this last either in substance or by the aid of the widely known "Spiritus Saponis Alkalinus," which Hebra first devised: 2 ounces (64.) of green soap to 1 ounce (32.) of alcohol, flavored with spirit of lavender. The hard or soda soaps are employed chiefly for toilet purposes.

"Over-fatty" or "superfatted" soaps, both soda and potash soaps, are neither alkaline nor neutral in reaction, but contain a slight excess of unsaponified fat. They are exceedingly mild in their deterative action upon the skin, though the lather produced in their use is not so abundant as that with the alkaline soaps. These are usually proprietary articles.

Medicated soaps, containing phenol, glycerin, tar, sulphur, and various oils, are sold in the shops; but they usually contain so small a portion of the individual medicament from which each is named that they are practically worthless except for purposes of ablution. Under cold pressure they may be made to contain medicinal substances in therapeutic proportions, but other forms of administration of such medicaments are preferable.

Fatty and Oily Substances are applied to the skin either directly, by pouring or by friction, or by the mediation of compresses, or bandages, which are saturated or are spread with the material to be applied. The oils may be used for either nutritive, soothing, or stimulating effects. To the first and second classes belong cod-liver, lard-, olive-, almond-, linseed-, neat's-foot, castor-, and similar oils; to the third class belong the oil of tar, of cade, of white birch, of the cashew-nut, and of juniper.

Fatty substances are also applied in the form of ointments or pomades. They are compounded with various medicinal substances, according to the requirements of each case, such as the salts of mercury, zinc, copper, lead, and sulphur; pyrogallol, chrysarobin, phenol, and hyposulphurous acid; tar, camphor, iodoform, balsam of Peru, chloral hydrate, and the extracts of opium, and belladonna.

Vaselin.—The products of petroleum refinement represented by this ointment, though not true fats, are employed increasingly for similar purposes. They are particularly useful as bases for ointments for applications to the hairy portions of the body, such as the scalp, where more consistent salves paste the hair to the surface in an unsightly mass.

In the class of soothing ointments, which are required in many cases in which the skin is the seat of a severe pruritus or of burning sensations, may be named the diachylon, benzoinated zinc-oxid, "cold-cream," lanolin, cucumber, petroleum, spermaceti, cacao-butter, and olive-oil with vaselin ointments. Those medicated with the several oleates and with the salts of bismuth, zinc, or lead are often of great value. As a rule, however, in most cases calling urgently for soothing applications, fat-containing dressings are not to be preferred to lotions or dusting-powders, or the two last named in combination. Ointments are rubbed gently over the affected surface, but they are more efficient when spread on bits of soft muslin and kept in contact with the skin.

McCall Anderson's ointment has long been employed for soothing inflamed surfaces. It is compounded by adding 1 drachm (4.) of bismuth oxid to 1 ounce (32.) of oleic acid, 3 drachms (12.) of white wax, 9 drachms (36.) of vaselin, and a few minims of the oil of roses. Ten parts of lanolin, with 20 of lard and 30 of rose-water, make another useful combination. Many of these ointments have been found to be irritating on account of the fatty acids which they develop, especially in hot weather. They may be kept sweet by the addition of a small quantity of formalin to each jar compounded.

The following formulæ are also useful: Boric acid, white wax, and paraffin each 10 parts, oil of sweet almonds 60 parts (H. Hebra); Bismuth oxid 1 drachm (4.), white wax 6 drachms (24.), vaselin and olive-oil, of each 1 ounce (32.); Boric acid 1 part, glycerin 24 parts, anhydrous lanolin 5 parts, vaselin 70 parts (Duhring's "boroglycerin cream ointment"). Other fatty applications are prepared by adding olive-, sweet-almond, or cottonseed-oil, as well as lard and lanolin, to lime-water in nearly equal proportions. These furnish a thick, emulsified substance, which requires to be well shaken before application. Any one of these emulsions may be medicated at will by the addition of zinc, bismuth, calamine, or other insoluble substance, which is mechanically mixed with the fatty emulsion when the whole is well shaken.

Stimulating ointments are usually made by the addition of such substances as tar, mercury, resorcin, salicylic acid, pyrogallie acid, chrysarobin, or sulphur to any one of the several salve-bases in common use.

Glycerin, even the best, when applied in its purity to the skin is usually irritating. It is, however, exceedingly useful when diluted or made a component part of lotions and ointments. When combined with starch in different proportions it makes a series of combinations known as *glycerols* or *glycerolats*. These combinations are pasty, semisolid substances, which are capable of varied medication, as in the glycerol of lead subacetate. They are useful chiefly as protectives of the skin-surface. Glycerin, used in a fluid soap, is an exceedingly valuable agent when a milder effect is desired than that produced by the spirit of soap described above. The Vienna preparation known as Sarg's fluid soap is an admirable substitute of this sort when a soft shampoo is required for the scalp.

Pastes employed for local application in diseases of the skin have been perfected greatly by Lassar and Unna.¹

These pastes are valuable, especially in the exudative affections, in which salves are often either not well tolerated or actually prove irritating to the skin. The pastes, when applied to such surfaces, form a protective and adhesive dressing, which may be medicated as desired. One of the best and most serviceable pastes is:

R—Zinc. stearat. cum. acetanilid.,		
Ol. oliv.,		
Unguent. aq. ros.,	āā 3ij;	8 M.

Or the following modification of Lassar's paste:

R—Zinci oxidi,		
Talc.,	āā 3ij;	8
Acid. salicylic.,	gr. x;	66
Vaselin,	3ss;	16 M.

Equal parts of lanolin, vaselin, talc, and zinc oxid form a base that is stiffer than the preceding and adheres better. To these bases may be added various remedies in desired proportions.

Duhring's modification of the original Lassar paste is: boric acid, ʒj (1.33); starch and zinc oxid, each 3ij (8.); vaselin, 3j (32.). Unna employs: starch, 3 parts; glycerin, 2 parts; water, 15 parts; boiled down to 15 parts. Half the quantity of any desired medication may be added to the amount ordered. Paraffin may be added in the making of very stiff pastes in the proportion of equal parts of this substance and water, twice the quantity of lanolin, and about $\frac{1}{2}$ of white wax.

Other pastes are prepared with kaolin (terra alba, or Armenian bole, of red color when it is desirable to have the application resemble the color of the skin), gum, lead, dextrin, glycerin, and other substances. Formulæ for each are appended.

Kaolin in a pure state, with equal parts of vaselin or glycerin, or with almond-, olive-, or linseed-oil in the proportion of two to one, is readily applied in a thin layer over the skin.

¹ Monatshefte, 1884, iii, p. 38.

For making lead-pastes, litharge is boiled with twice the quantity of vinegar until the latter has evaporated and there is left a damp but drying paste, which on occasion may be remoistened with a small quantity of vinegar.

R—Lithargyr. subt. pulv.,	℥jss;	45
Aceti,	℥ijss;	75
Coque usque ad consistent. pastæ: deinde adde ol. lini [v. glycerini, v. ol. olivæ], 10.—M.		

In the two forms of paste above described the adhesive and desiccative qualities are obtained from the main ingredients, but in those resulting from combinations of gum, starch, and dextrin these results are for the most part obtained by the addition of other ingredients, such as sulphur or zinc. A good basis, semisolid, rapidly drying, and fixing its ingredients well upon the surface, is the following:

R—Zinc. oxid.,	℥jss;	45
Acid. salicylic.,	℥ss;	2
Amyli oryzæ,		
Glycerin.,	āā ℥iij;	12
Aq. dest.,	℥ijss;	75
Coque ad., ℥ivss (145).		

For a sulphur-paste:

R—Sulphur. præcipit.,	℥jss;	45
Calc. carb.,	℥ss;	2
Zinc. oxid.,	℥ss;	15
Amyli oryzæ,	℥iij;	12
Glycerin.,	℥ss;	15
Aq. dest.,	℥ijss;	75
Coque ad., ℥iv (120).		

To make use of dextrin, the official pulverized article is selected, and a simple paste of this forms a good drying base. An added half-weight of glycerin is required if powders are also combined with the paste—*e. g.*:

R—Zinc. oxid.,	℥jss;	45
Dextrin.,		
Aq. dest.,	āā ℥ss;	15
Glycerin.,	℥jss;	45
Sulphur. sublim. [vel. sod. sulpho-ichthyol.],	℥ss;	2
Coque.		

A mixture of dextrin and lead is thus prepared:

R—Lithargyr.,	℥j;	30
Acet.,	℥jss;	45
Coque ad remanent., 50.		
Adde:		
Dextrin.,		
Aq. dest.,		
Glycerin.,	āā ℥ss;	15
Coque.		

If too consistent, these pastes are made to spread easily by the addition of a few drops of hot water.

For gum-pastes, gum Arabic is used in the proportion of 1 part of the mucilage and glycerin to 2 parts of the powder selected, mixed without heat—*e. g.*:

R—Zinc. oxid.,	℥jss;	45	M.
Hydrarg. oxid. rub.,	℥ss;	2	
Mucilag. acac.,			
Glycerin.,	āā ℥ss;	15	
R—Cret. preparat.,			M.
Sulphur. sublim.,	āā ℥ss;	2	
Picis liquid.,	℥ij;	8	
Amyli,	℥ss;	15	
Mucilag. acac.,			
Glycerin.,	āā ℥ss;	15	
R—Acid. salicylic.,	℥ss;	15	M.
Glycerin.,	℥ss;	15	
Mucilag. acac.,	℥j;	30	
Ol. ricini,	℥ijss;	10	

The following details are to be noted respecting the availability of these pastes for different ingredients: Lead is best used as an acetate, either in a simple paste or with dextrin, the carbonate, oleate, and iodid combining well with both. Zinc oxid and sulphur combine well with kaolin, lead, starch, dextrin, and gum. Sulphur combines well with the three last named, poorly with kaolin, and not at all with lead. Ichthyol suits well with all save the gum-pastes. Naphthol, calomel, corrosive sublimate, red and white precipitates, phenol, chloral hydrate, camphor, and salicylic acid can be incorporated with all, the last named in smaller proportion with gum-pastes. Tar is better united with starch, dextrin, and gum than with the others. Iodin and iodoform naturally do not suit well with the starch- and dextrin-pastes. Chrysarobin and pyrogallol are united with kaolin and gum-pastes, and should not be added to them. Fatty and soapy substances, if commingled in large amounts with these pastes, injure their special properties.

Glycogelatins are useful for protecting a surface and excluding the air. They are made with varying proportions of glycerin, gelatin, zinc oxid, and water. When cold they are solid, but when melted on a water-bath can be painted readily over a surface, upon which on cooling they form an adherent protective coating. Before the gelatin has hardened on the skin it is well to pat it with cotton, or to lay over it a piece of thin gauze or muslin to form an additional protection and to prevent the paste sticking to the clothing. A firm but soft and flexible gelatin is made by mixing on a hot-water bath 1 part of zinc oxid, 2 of gelatin, 3 of glycerin, and 4 of water. More gelatin in the preparation makes it firmer and causes it to dry more quickly. A greater proportion of glycerin, on the other hand, interferes with the

complete drying of the surface, but makes a softer preparation, more acceptable to some skins, and very useful where a bandage can be applied. Zinc oxid helps give body to the gelatin, but if used in too large proportion interferes with the coherence of the preparation, so that it cracks when dry. To the glycogelatin may be added white precipitate, sulphur, ichthyol, thiol, chrysarobin, iodoform, or other antiseptics. Some drugs, as salicylic acid, resorcin, naphthol, and phenol tend to destroy the coherence of the gelatin. Fox says that this obstacle may be removed by adding to the paste 5 to 10 per cent. of fresh lard.

Varnishes containing glycerin and a single gum are often very serviceable in protecting the skin. They are especially useful on the face, as they are transparent and inconspicuous.

Pick's varnish (linimentum exsiccans) is made as follows:

R—Tragacanth,	5 parts
Glycerin,	2 parts
Distilled water,	93 parts

The tragacanth is soaked in a portion of water from ten to twelve hours and triturated to a perfectly smooth mass before adding the glycerin and other ingredients ordered. The jelly may be prepared without delay by triturating the tragacanth with boiling water, but the result is not so good.

This jelly is applied without heating and quickly dries on the skin. An improvement on this varnish is Elliot's bassorin paste, which keeps better than the former. The formula is as follows:

R—Bassorin,	℥jss;	45
Dextrin.,	℥vj;	24
Glycerin.,	℥ijss;	10
Water to make	℥iiij;	90

This should be kept in a tightly closed jar, as it dries rapidly on exposure to the air. Like the other pastes, it not only serves as a protective coating, but also as a base for the application of other remedies.

Powders are mechanically dusted over the surface of the skin for the purpose of protecting it, and occasionally, also, to produce an astringent or antipruritic effect. To be serviceable, they should generally be rendered impalpable by sifting them carefully through a fine silk bolting-cloth. They are composed of starch, talc, magnesia, lycopodium, calamine, bismuth, boric acid, the several stearates, camphor, tannin, zinc oxid, iodoform, rice, kaolin, magnesium silicate, orris root, salicylic acid, aristol, euophen, and similar substances. The articles sold by grocers as "gloss starch" and "corn-starch farina" are usually much more finely bolted than the dusting-powders extemporaneously prepared by pharmacists. All starchy substances are open to the objection of forming little pasty rolls or "cakes" when wetted with serum or with sweat. Lycopodium, which consists of irregularly shaped globular pollen-sporules, never behaves in this

way, and is, for that reason, deservedly popular. Zinc-stearate with acetanilid is excellent for similar reasons, and when dusted on the surface forms a dressing impervious to moisture.

Medicated powders may be first dissolved in alcohol, ether, or chloroform. The solution is then mixed with starch or with French chalk. Evaporation of the menstruum is conducted without artificial heat, and a fine starch or chalk-powder results.

For absorbent purposes Grundler¹ has shown that by far the most effective powder is magnesium carbonate.

Plasters are employed when it is desired to exert a more or less continuous effect upon the skin, and are thus necessarily consistent and desirable. The resin-plasters are less useful in skin diseases, because more irritating, than the lead-plasters. In the zinc-oxid adhesive plaster the irritating effects of the resin have been entirely overcome, and the result is a plaster which has excellent adhesive qualities and which rarely causes irritation even to sensitive skins. It thus answers admirably where simple protection is desired, and may be safely employed in order to retain other dressings in place. Unna's plaster-mulls are described below. The mercurial plasters are useful, especially in syphilitic lesions of the skin.

A valuable addition to the list of methods for applying medicated ointments to the skin has been devised by Unna. His *salve-muslins*, or salve-mulls, are strips or bandages of muslin thoroughly impregnated and thickly spread with ointments medicated with almost every desirable substance, from zinc-oxid to tar, thymol, salicylic acid, and mercury. They are elegantly made, and when exported are surrounded by impermeable tissue, so that they remain fresh and sweet for several weeks, or even for months if kept in a cool place, but deteriorate rapidly if exposed to the air of a warm room. They are efficacious, and, as a rule, well liked by patients. They are available in skin diseases of the exudative class affecting the extremities, but should be avoided when not recently prepared.

Unna's *plaster-mulls* seem to be less useful. They are plasters thinly spread on gutta-percha cloth, and manufactured with a wide range of medicinal constituents. They serve a good purpose in the protection of parts of the skin exposed to friction.

Salve-pencils (*stili unguentes*) and **Paste-pencils** (*stili dilubiles*), the latter destitute of fat and soluble when moist, the former insoluble in water and compounded of fatty substances, are pencil-sized crayons made with wax, gum, and starch, for application to limited areas of the skin. The several mercurials, arsenic trioxid, cocaïn, salicylic acid, and other medicaments may be applied in this way to the surface.

Poultices.—These are not often ordered in the management of diseases of the skin, except for the purpose of softening crusts with a view to their removal. They are made, both warm and cold, with

¹ Monatshefte, 1888, vii, p. 1029.

linseed-meal, potato-starch, bread and milk, oatmeal, and cornmeal. These applications are objectionable in all conditions in which a macerative effect of the epidermis is produced; and also in which microorganisms may find a culture-field in the mass of the poultice. Poultices, in any needful case, may be made antiseptic by the addition of formalin, boric acid, or mercuric chlorid.

Lanolin, or wool-fat, was first introduced as a salve-base by Liebreich, of Berlin. It is a substance obtained from keratinic tissues, and contains cholesterin-fat instead of glycerin, with but 30 per cent. of water. It has a bright-yellowish color, a distinct odor of the sheep, and is neutral; when pure it is never acid in reaction. The refined product is free from cholesterol compounds and requires no fatty addition. This substance is readily absorbed from the surface of the skin, and, either pure or medicated, may be regarded as a useful addition to the bases of ointments. The *adeps lanæ* answers the same end.

Eucerin¹ was introduced by Unna. It is made by the action of some substance obtained from wool-fat upon vaselin. It resembles lanolin, and is capable of taking up large quantities of water. It is recommended in ichthyosis and other dry conditions of the skin.

Oleates.—The oleates of zinc, mercury, copper, lead, and other metals have been employed with advantage in the topical treatment of disorders of the skin. Of these, the oleates of mercury and of lead are decidedly the most valuable. The latter is represented by Hebra's white diachylon ointment. The mercuric oleate is serviceable in syphilitic, parasitic, and other disorders.

Vasogen.—These products bid fair to supplant the oleates in their ready absorption from the skin-surface. In mercurial inunction vasogen-mercury capsules supply the exact amount required for employment at each sitting.

Collodion and Traumaticin are employed for the purpose of applying a remedy to the skin, and at the same time for protecting or contracting the surface to which the application is made. Traumaticin is the name given to a solution of gutta-percha in chloroform, in the proportion of 10 per cent. In this way bismuth, cantharides, sulphur, chrysarobin, zinc oxid, white precipitate, iodin, and other substances may with advantage be applied to the surface, and the action of each be definitely limited to the margins of a single patch of disease.

Tar.—Tar in its several varieties, crude and distilled, together with its derivatives, occupies an important place among efficient topical agents. In general, it seems to exert upon the epidermis a local influence, which extends more deeply as the remedy is continuously applied. At times both irritative and inflammatory effects are thus induced, and even systemic intoxication when absorption from the skin occurs. Pix liquida, or the oleum picis, is the favorite article of this group with most American physicians; but the oleum cadini, or

¹ Jackson, Jour. Cut. Dis., 1910, xxviii, p. 294.

oil of juniper, and the oleum rusci, or oil of birch, are rather more generally employed by experts. The last-named, found in purity and abundance and to be had at a low price, is recommended above the others. In Vienna the distilled oil is preferred, but there is good reason to believe that the crude oil is more efficacious.

The skill of a physician intrusted with the management of a disease of the skin might almost be measured by his success in the use of tar. He who has not had experience in its employment is urgently advised to select one member of the tar-family and learn thoroughly how to apply that, singly and in combination, either as a lotion or in salve. Properly employed, it will favor involution of lesions, lessening hyperemia, infiltration, scaling, and discharge. It serves admirably as an antipruritic. It may, however, produce severe inflammation of the skin.

To produce the benign or emollient effects of tar, it is best mixed with some soothing or astringent powder, and with this end in view nothing is better than chalk. Spender's hints¹ for making such an ointment are admirable: Finely levigated chalk is strewed into melted lard in a stone jar, the whole being stirred until it is cold. Then at first the smallest quantity of tar sufficient to make a brownish smear of color is added to the quantity of salve employed for use. This color can be successively deepened at will. Auspitz advises the use of the tars in a pure state, applied in very small quantities with a strong bristle-brush and well rubbed in. In combination with one of the most valuable of all substances for topical use in cutaneous therapeutics, viz., sulphur, tar enjoys a special reputation. The Wilkinson salve modified (*q. v.*) represents such a combination.

A group of substances which occupy a therapeutic position inferior to the tars, but which serve an important end in the management of cutaneous diseases by the production of similar effects, are phenol, creosote, salicylic acid, benzol, naphthol, iodol, thiol, chrysarobin, pyrogallol, resorcin, and jequirity.

Ichthyol,² fish-oil, introduced to the profession by Unna, is the distillate of a bituminous and sulphurous deposit of petrified fishes and marine fossils found in the Tyrol. Its chemical formula is $C_{26}H_{36}S_3Na_2O_6$. It has a tarry appearance, odor, and consistency. It is soluble in water, partly so in ether and alcohol, and can be incorporated in any desired proportion with fat, vaselin, and lanolin. It has been used both pure and diluted; and several proprietary articles (plasters, soaps, salves, and medicated cotton) are in the market. It has been used both in America and in Europe in cases of leprosy, pruritus, acne, sycosis, eczema, psoriasis, and a number of other cutaneous disorders.³ It is used in solutions of from 10 to 50 per cent. and

¹ Practitioner, June, 1883, p. 402.

² McMurtry, Jour. Cut. Dis., 1913, xxxi, pp. 648 to 664 and 765 to 775, incl.

³ See Baumann and Schöffen, Monatshefte, 1883, ii, p. 257; Unna, *ibid.*, 1882, i, p. 225; Deut. med. Zeit., 1883, iv, p. 217; Samml. klin. Vort., 1885, No. 252; Lorenz, Deutsch. med. Wochenschrift, 1885, xi, p. 627; Stelwagon, Jour. Cut. Dis., iv, p. 326; Zeisler, Chicago Med. Jour. and Exam., 1886, liii, p. 32.

in salves of from 5 to 20 per cent. strength. As before stated, it is also administered internally, more particularly in the management of rheumatism, in doses of from 15 to 20 drops. It does not seem to have a disturbing effect upon the stomach.

Unpleasant results have been reported as following its application in a single instance (Sinclair). A four months' old infant sank into a stupor two hours after its head and limbs were smeared with a salve composed of one part of ichthyol to five of vaselin.

Thiol makes an excellent substitute for ichthyol for most purposes, and lacks the unpleasant odor of the latter.

Resorcin,¹ in ointments of the strength of from 5 to 20 per cent., serves as an antipruritic and alterative. Stelwagon reports an anodyne effect following its use. The same experimenter has modified Ihle's formula by adding 1 drachm (4.) of resorcin to 1 to 2 drachms (4.-8.) of castor-oil, 5 minims (0.33) of Peruvian balsam, and 4 ounces (120.) of alcohol, for use in alopecia and seborrhea of the scalp. It is a valuable parasiticide in lotions of the strength of from 5 to 10 per cent., and is especially useful in disorders of the scalp due to seborrhea.

Naphtol, or β -naphtol, as it is termed chemically, first introduced by Kaposi, is chiefly valuable in scabies, but has also been used in the management of eczema, psoriasis, and other exudative affections. Van Harlingen² has found it to answer well in seborrhea of the scalp. Neisser has described renal disorders as resulting from its use in children, but MM. Josias and Nocard³ report that in ordinary medicinal doses it is harmless. The fact that the naphtol preparations are odorless and do not stain the skin is to be set down in their favor.

Naftalan.—This is a distillation product from crude nafta that is found in the Caucasus. It is a thick fluid of dark-green color and contains $2\frac{1}{2}$ to 4 per cent. of soap. It may be mixed with powders, thus producing an ointment of any consistency. It is advised in inflammations of the skin accompanied by moisture.

Boric Acid is of great value in diseases of the skin, and is extensively employed as a lotion and in ointments and powders. As a rule, it exercises a sedative effect upon the surface to which it is applied. Over mucous surfaces it is occasionally a source of moderate irritation.

Salicylic Acid⁴ operates especially upon the keratinized tissues of the epidermis, softening and separating the external portions of the horny layer from its deeper connections. For this reason it has a special value in all the hyperkeratotic dermatoses. In somewhat weak strength it is employed as an antipruritic agent. It is most often employed in salves or pastes, but is also used in lotions, being soluble in 2.5 parts of alcohol, 2 parts of ether, or 450 parts of water. It is a common ingredient of most of the popular corn- and wart-cures.

¹ McMurtry, Jour. Cut. Dis., 1913, xxxi, p. 255.

² Amer. Jour. Med. Sci., 1883, n. s., lxxxvi, p. 479.

³ Annales, 1885, s. ii, vi, p. 257.

⁴ McMurtry, Jour. Cut. Dis., 1913, xxxi, p. 166.

Phenol, since in value as an antiseptic it has been largely surpassed by other articles, is chiefly employed today upon the skin as an antipruritic. It is applied in the form of lotion, salve, and paste, but much more often in lotions having the strength of from 10 to 20 grains to the ounce (0.66–1.33 ad 32.). Other acids—nitric, sulphuric, lactic, acetic, hydrochloric, benzoinic, tannic, chromic—are employed either for caustic, destructive, or stimulating effect, usually in liquid form. Tannic acid, however, is occasionally employed as a powder, in which form its astringent quality is combined with the soothing or antiseptic effect of other substances in powder.

Chrysarobin, Pyrogallol, and Anthrarobin are useful as cutaneous stimulants capable of determining in the skin to which they are applied a characteristic dermatitis limited to the site of the application. Chrysarobin is especially useful in the local treatment of psoriasis, lepra, and the disorders due to vegetable parasites. It is employed in from 1 to 10 per cent. strength, in salve, lotion, or in collodion or traumaticin. A useful combination in the parasitic disorders of the scalp due to the microsporon Audouini or to the trichophyton is a solution of chrysarobin in oil of turpentine, about 1 part in 250. A chief objection to its use is the consequent staining of the skin and articles of apparel. On the scalp the hairs are turned to a yellowish-green shade. Pyrogallol oxidizes after exposure and turns the skin a blackish color. It is useful in many cases of lichen planus, eczema, and the diseases due to the vegetable parasites. It has been employed in the strength of 50 per cent. in the removal of epitheliomata. Anthrarobin, though inferior to both of the other articles named, is effective in the same general manner.

Iodin, especially in the form of tincture, is useful as a local application in certain of the seborrheas, and as a parasiticide. It is often employed with mercury in the form of an ointment. The ointments compounded of the salts of iodine with mercury, though of unquestioned efficacy, are less employed today than formerly.

Jequirity (*Abrus precatorius*), employed by ophthalmologists for the purpose of inducing artificial inflammation of the conjunctiva, has been used by Shoemaker¹ in the management of lupoid and other ulcers. One part of the cleansed, decorticated, and bruised grains, macerated for twenty-four hours, and reduced by rubbing in a mortar to a smooth paste, was added to sufficient water to make four parts. This emulsion was used for local application.

Sulphur,² popularly employed chiefly as a laxative or for the local treatment of scabies, has also a deserved reputation in cutaneous therapeutics as an external agent in a wide range of non-parasitic disorders. Hebra once regarded it as valueless in eczema, but his opinions on this point are not now generally accepted. It is a remedy of great merit in all seborrheic conditions. Precipitated sulphur is

¹ Lancet, 1884, ii, p. 185.

² McMurtry, Jour. Cut. Dis., 1913, xxxi, p. 322.

to be preferred to the other compounds of the pharmacopœia. It may mechanically be incorporated with salve-bases, or chemically combined with vaselin and other petroleum-products, a process by which, as experiments have shown, its therapeutic value is not increased. It is also applied, after mechanical union with various substances, as a lotion. It is irritating to the acutely inflamed skin, but is much better tolerated than the tars in conditions of subacute or chronic exudation.

Formaldehyd is a valuable antiseptic agent, most commonly employed as formalin, a proprietary preparation representing 40 per cent. of the compound. Formalin in the strength of 1 per cent. commonly produces a slight irritation over the thin skin of the face; and after application in the strength of 2 per cent., which should be rarely exceeded on the cutaneous surface, there follows a decided sensation of burning, with a resulting transient erythema. It is a remedy of the highest value in the treatment of syphilodermata, acne, seborrhea, the disorders produced by the vegetable parasites, several of the eczemas, impetigo, and other affections. It is well to color the solution with a trace of fuchsin.

Pyoktanin-blue is employed in aqueous saturated solution as a parasiticide in those disorders of the skin especially which affect regions beneath the clothing or which may be protected by dressings from exposure to the eye. It is highly valuable as a local and painless application in circumscribed patches of weeping or scaly eczema, in many of the ulcerating syphilodermata, in lupus, and in ringworm. It should be applied daily in several coats, each coat being permitted to dry before the next is superimposed.

Potassium Permanganate belongs to the same category as pyoktanin-blue, with the disadvantage that in some strengths it is productive of pain, while the pyoktanin solution is unproductive of pain. From 2 to 10 per cent. solutions of the potassium salt may be painted on the affected surface one or more times daily till the desired effect is produced. The indications for its use are those which the pyoktanin solution is intended to meet.

Mercury and its compounds are of value in the local treatment of many disorders of the skin, syphilitic and non-syphilitic. The preparations of mercury employed as topical agents in the treatment of diseases of the skin are of the highest value. They include corrosive sublimate, calomel, the red and yellow oxids, the biniodid and cinnabar, the white and red precipitates, and the nitrate. The most commonly employed of their combinations are the "black wash," ointment of the nitrate, and mercurial ointment. Fumigation of the surface by vaporization of either cinnabar or calomel or the two in combination is chiefly employed in the local treatment of syphilodermata. The bichlorid is most often applied as a lotion; calomel and white precipitate in ointments; though calomel is often effectively combined with talc or starch as a powder. Startin's nitric oxid of mercury ointment represents a combination of two mercurials: red mercuric oxid, 6 grains (0.4); mercury bisulphate, 4 grains (0.25);

simple cerate, 1 ounce (32.). Corrosive sublimate as a parasiticide is of great importance in the treatment of several cutaneous disorders due to the presence of microorganisms, as, for example, lupus vulgaris.

Chloral-Camphor and Phenol-Camphor have value chiefly as antipruritics. The former is obtained by rubbing together chloral hydrate and gum-camphor (Bulkley) until they form a clear liquid of pungent odor. Phenol-camphor is made by gradually adding camphor to melted crystals of phenol, a colorless liquid resulting, having the fragrant odor of camphor without that of the acid. It is a useful local anesthetic agent, being insoluble in water, but freely soluble in chloroform, ether, and alcohol.

Many Agents are employed upon the surface of the integument to produce in various degrees a *caustic* or *destructive* effect. Among these may be named the thermo-cautery (Paquelin-knife), galvanocaustic apparatus, the mineral acids and alkalies, sodium ethylate, arsenic, zinc-chlorid, several mercurial compounds, mercuric nitrate, mercuric chlorid, antimonious chlorid, cupric sulphate, and argentic nitrate. Several of these substances in weak solution are employed as milder agents for the production of irritative or even inflammatory effects. To the latter class should be added iodine, chloroform, tartar emetic, croton-oil, and cantharides. These destructive effects are of advantage in the treatment of disorders of the integument due to parasites, either animal or vegetable. Of those employed for this purpose, and not mentioned above, may be named petroleum and staphysagria, for the destruction of lice; sulphur, styrax, and balsam of Peru, for the destruction of acari; and sulphur and its compounds and a number of derivatives from tar, for the destruction of vegetable parasites.

A large list of medicinal substances might be added which are occasionally employed in cutaneous affections, some very rarely, the most with questionable effect. Among them may be named alcohol, which is of high value as a disinfectant, and hydrogen peroxid, having a similar effect; ether, the opium alkaloids, cocaine, belladonna, cannabis indica, and aconite, for anesthetic and antipruritic effect; and ergot, cantharides, mustard, croton-oil, tartar emetic, benzoin, capsicum, rosemary, and the several salts of lead. Many of the articles named, such as cantharides, rosemary, and capsicum, are employed as lotions for the scalp in the several alopecias.

The salts of zinc (sulphate, sulphocarbolate, acetate, oxid), of copper, alum, lead, bismuth, and other metals, are of service in diseases of the skin as productive of both astringent and stimulating or even of caustic effects. The careful adjustment of the dosage in each instance is of the highest importance, and is practically indispensable for the production of beneficial effects.

Counter-Irritation over the Vasomotor Centres, as recommended by Crocker, is an efficient means of relieving fixed and obstinate cutaneous disorders. It may be produced by the action of sinapisms, blisters, or caustics over the region selected for such irritation.

Hyperemic Treatment (Biers).¹—This method of treatment finds some application in cutaneous diseases. Both passive or venous and active or arterial hyperemia may be used here as well as in other branches of medicine and surgery. Passive hyperemia may be induced by an elastic bandage or by means of cupping. Active hyperemia is induced by hot air. By one or the other of the methods, such diseases as eczema, psoriasis, sycosis, keloid, alopecia areata, lupus vulgaris, and staphylococcus infections may be benefited.

Electrolysis is a method of the greatest value in the treatment of a large number of cutaneous affections, such as hypertrichosis, telangiectases, molluscous tumors, and warts. It is accomplished by the aid of the galvanic battery in the manner described in this work in the pages devoted to the first of the disorders named.

The Minor and Other Surgical Operations required in the management of some affections of the skin are detailed in the treatises devoted to that subject. Among such procedures may be named skin-grafting, both by the methods of Reverdin and Thiersch, and the several devices of plastic surgery. Strictly dermatological procedures to which resort must often be made are: epilation in hyphogenous sycosis and other affections; massage, especially by the massering-ball; the operations on the face, especially in acne, when opening small abscesses, removing comedones, and incising papules; and multiple scarification, as in telangiectases and other lesions.

Numerous surgical and other appliances are found useful as adjuvants in the treatment of skin-diseases. They may be employed to support, protect, or compress the surface, or merely to aid in the retention of dressings or external medicaments. Thus, the ordinary roller-bandage is applicable to many portions of the body; the suspender, or suspensory bag, to the scrotum; elastic or inelastic stockings to the feet and legs; kid, rubber, and thread gloves to the feet and fingers; and various skull-caps, face-masks, and mittens are employed in the case of infants and children to protect affected surfaces from the traumatisms of scratching.

Apart from the surgical apparatus required for ablation of tumors or severe operations, a number of instruments are required for the daily use of the dermatologist. Among these may be named:

A set of variously sized dermal curettes. These sharp-edged spoons are for erosion of the surface, and should, for general use, have in each a fenestrum large enough to permit the escape from the floor of the spoon of all collected substances. The small-sized spoons, however, with solid bowl and sharp edges, largely used in Vienna, are preferable for use, especially about the face, in many skin-affections. Epilating-forceps, with easy springs and smooth blades meeting in perfect apposition. A set of Piffard's comedone-extractors, provided at each extremity with a differently sized, minute, spoon-shaped and perforated bowl, the convex surface of which is pressed over the comedo with the

¹ Biers' *Hyperemic Treatment*, 1908; Willy Meyer and Victor Schwueden

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The Minor and Other Surgical Operations required in the management of some affections of the skin are detailed in the treatises devoted to that subject. Among such procedures may be named skin-grafting, both by the methods of Reverdin and Thiersch, and the several devices of plastic surgery. Strictly dermatological procedures to which resort must often be made are: epilation in hyphogenous sycosis and other affections; massage, especially by the massering-ball; the operations on the face, especially in acne, when opening small abscesses, removing comedones, and incising papules; and multiple scarification, as in telangiectases and other lesions.

Numerous surgical and other appliances are found useful as adjuvants in the treatment of skin-diseases. They may be employed to support, protect, or compress the surface, or merely to aid in the retention of dressings or external medicaments. Thus, the ordinary roller-bandage is applicable to many portions of the body; the suspender, or suspensory bag, to the scrotum; elastic or inelastic stockings to the feet and legs; kid, rubber, and thread gloves to the feet and fingers; and various skull-caps, face-masks, and mittens are employed in the case of infants and children to protect affected surfaces from the traumatisms of scratching.

Apart from the surgical apparatus required for ablation of tumors or severe operations, a number of instruments are required for the daily use of the dermatologist. Among these may be named:

A set of variously sized dermal curettes. These sharp-edged spoons are for erosion of the surface, and should, for general use, have in each a fenestrum large enough to permit the escape from the floor of the spoon of all collected substances. The small-sized spoons, however, with solid bowl and sharp edges, largely used in Vienna, are preferable for use, especially about the face, in many skin-affections. Epilating-forceps, with easy springs and smooth blades meeting in perfect apposition. A set of Piffard's comedone-extractors, provided at each extremity with a differently sized, minute, spoon-shaped and perforated bowl, the convex surface of which is pressed over the comedo with the

¹ Biers' Hyperemic Treatment, 1908; Willy Meyer and Victor Schwieden.

simple cerate, 1 ounce (32.). Corrosive sublimate as a parasiticide is of great importance in the treatment of several cutaneous disorders due to the presence of microorganisms, as, for example, lupus vulgaris.

Chloral-Camphor and Phenol-Camphor have value chiefly as antipruritics. The former is obtained by rubbing together chloral hydrate and gum-camphor (Bulkley) until they form a clear liquid of pungent odor. Phenol-camphor is made by gradually adding camphor to melted crystals of phenol, a colorless liquid resulting, having the fragrant odor of camphor without that of the acid. It is a useful local anesthetic agent, being insoluble in water, but freely soluble in chloroform, ether, and alcohol.

Many Agents are employed upon the surface of the integument to produce in various degrees a *caustic* or *destructive* effect. Among these may be named the thermo-cautery (Paquelin-knife), galvanocaustic apparatus, the mineral acids and alkalies, sodium ethylate, arsenic, zinc-chlorid, several mercurial compounds, mercuric nitrate, mercuric chlorid, antimonious chlorid, cupric sulphate, and argentic nitrate. Several of these substances in weak solution are employed as milder agents for the production of irritative or even inflammatory effects. To the latter class should be added iodine, chloroform, tartar emetic, croton-oil, and cantharides. These destructive effects are of advantage in the treatment of disorders of the integument due to parasites, either animal or vegetable. Of those employed for this purpose, and not mentioned above, may be named petroleum and staphysagria, for the destruction of lice; sulphur, styrax, and balsam of Peru, for the destruction of acari; and sulphur and its compounds and a number of derivatives from tar, for the destruction of vegetable parasites.

A large list of medicinal substances might be added which are occasionally employed in cutaneous affections, some very rarely, the most with questionable effect. Among them may be named alcohol, which is of high value as a disinfectant, and hydrogen peroxid, having a similar effect; ether, the opium alkaloids, cocaine, belladonna, cannabis indica, and aconite, for anesthetic and antipruritic effect; and ergot, cantharides, mustard, croton-oil, tartar emetic, benzoin, capsicum, rosemary, and the several salts of lead. Many of the articles named, such as cantharides, rosemary, and capsicum, are employed as lotions for the scalp in the several alopecias.

The salts of zinc (sulphate, sulphocarbolate, acetate, oxid), of copper, alum, lead, bismuth, and other metals, are of service in diseases of the skin as productive of both astringent and stimulating or even of caustic effects. The careful adjustment of the dosage in each instance is of the highest importance, and is practically indispensable for the production of beneficial effects.

Counter-Irritation over the Vasomotor Centres, as recommended by Crocker, is an efficient means of relieving fixed and obstinate cutaneous disorders. It may be produced by the action of sinapisms, blisters, or caustics over the region selected for such irritation.

Hyperemic Treatment (Biers).¹—This method of treatment finds some application in cutaneous diseases. Both passive or venous and active or arterial hyperemia may be used here as well as in other branches of medicine and surgery. Passive hyperemia may be induced by an elastic bandage or by means of cupping. Active hyperemia is induced by hot air. By one or the other of the methods, such diseases as eczema, psoriasis, sycosis, keloid, alopecia areata, lupus vulgaris, and staphylococcus infections may be benefited.

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A set of variously sized dermal curettes. These sharp-edged spoons are for erosion of the surface, and should, for general use, have in each a fenestrum large enough to permit the escape from the floor of the spoon of all collected substances. The small-sized spoons, however, with solid bowl and sharp edges, largely used in Vienna, are preferable for use, especially about the face, in many skin-affections. Epilating-forceps, with easy springs and smooth blades meeting in perfect apposition. A set of Piffard's comedone-extractors, provided at each extremity with a differently sized, minute, spoon-shaped and perforated bowl, the convex surface of which is pressed over the comedo with the

¹ Biers' Hyperemic Treatment, 1908; Willy Meyer and Victor Schwieden.

orifice immediately over the black head of the plug. This is a great improvement over the old-fashioned comedo-extractor shaped like a watch-key, and the discomfort to the patient by its use is greatly reduced. A set of half-inch and four-inch lenses for examining the sur-

FIG. 22



Irido-platinum needle.

FIG. 23



Miliun-needle.

FIG. 24



Scarifying-spud.

FIG. 25



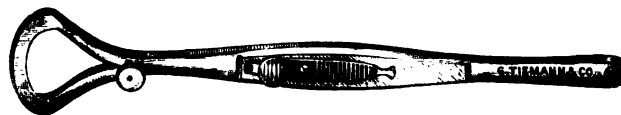
Epilating-forceps.

FIG. 26



Piffard's grappling-forceps.

FIG. 27



Piffard's cutisector.

FIG. 28

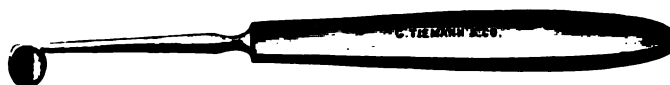


Dermal curette.

face of the skin. Needle-holders with light handles for firmly grasping the needles used in opening pustules, etc. The needles, some of them, should be flat, with a double-cutting edge; others should be rounded neatly on an emery-wheel, and all of them carefully disinfected. Too

many precautions cannot be taken in the practice of dermatology with respect to the disinfection of all instruments made to penetrate the skin. Probes, exploring-needles, fine dressing-forceps, delicate straight and curved scissors, and other instruments from the ordinary pocket-case of the surgeon are indispensable. The instruments required for use in connection with the galvanic battery are enumerated in the chapter on Hypertrichosis.

FIG. 29



Dermal curette.

FIG. 30



Hess's pleximeter, for observing the skin under pressure.

FIG. 31



Piffard's modification of Unna's comedo-extractor.

FIG. 32



Keyes' cutaneous punch.

FIG. 33



Hyde's massering-ball.

Radiotherapy¹ (Treatment by X-rays) has an established position as a therapeutic agent in cutaneous medicine. Among the diseases in the management of which it has distinct value are epithelioma, lupus vulgaris and other forms of cutaneous tuberculosis, coccogenous and

¹ For complete presentation of the subject and bibliography, see: Freund, *Grundriss der gesamten Radiotherapie*, Berlin and Vienna, 1903; Williams, *The Röntgen Rays in Medicine and Surgery*, New York, 1901; Pusey-Caldwell, *The Röntgen Rays in Therapeutics and Diagnosis*, Philadelphia, 1903; Stelwagon, *Jour. Cut. Dis.*, 1903, xxi, p. 345 (with discussion before the Amer. Derm. Assoc.); Pusey, *ibid.*, p. 355 (with discussion before the Amer. Derm. Assoc.); Bronson, *ibid.*, p. 375. For recent papers on radiotherapy, see *Transactions of the Sixth International Dermatological Congress*, 1908.

hypogenous sycosis, acne vulgaris, rosacea, psoriasis, hypertrichosis, lupus erythematosus, ringworm, and favus. The list includes diverse morbid conditions, but these in turn actually are remedied in many cases by one or the other of the therapeutic properties of the agent. X-rays *per se* are not germicidal, but indirectly, through tissue-reaction, they may produce such effects in a high degree, as shown by the partial or complete arrest of purulent discharge from the surface of carcinomatous or other ulcers subjected to their action. They produce degeneration in cells of embryonic type without destroying the healthy stroma in which they have developed; cells also of higher differentiation are affected early. As a consequence, hair-follicles and sebaceous glands may become partially or wholly atrophied under the influence of the ray, the result depending upon the dosage employed.

Clinical effects of the rays upon normal skin vary from slight erythema and pigmentation to deep-seated, destructive inflammation. The earliest evidence manifested is either pigmentation or erythema. The former may be lentiginous or exhibited as a diffuse, brownish discoloration of different shades, the amount of pigment varying as a rule with the complexion of the patient. Usually this disappears within a few days or weeks, though it may persist for several months. Erythema appears early and soon subsides, with superficial desquamation and pigmentation, if treatment be suspended in time. The process usually lasts from a few days to two weeks, and is accompanied by mild itching or pricking sensations. Should the inflammatory process progress to a further stage, vesicles appear on the erythematous area. These may be either superficial and short-lived, soon drying and disappearing, or more deeply situated, and associated with greater swelling and increased redness, the whole area becoming denuded of its superficial epithelium and showing an excoriated and weeping surface (*x-ray dermatitis*). This surface usually becomes covered with a yellowish or grayish, adherent pellicle, composed of necrotic epithelium, which gradually retracts, its place being taken by normal cornified cells. In case the pellicle does not form, bluish islands of epithelium appear over the weeping surface, which by enlargement and coalescence cover the area. The new epithelium is smooth, delicate, bluish-white in color, devoid of pigment and hair, and may remain sensitive to external influences for some time. The duration of this degree of dermatitis is from a few weeks to several months, and the subjective sensations vary; usually a burning, tingling, or itching sensation is experienced, with occasionally marked tenderness and some pain. In a dermatitis of serious portent, the subcutaneous and deeper tissue is involved. The inflammation begins with erythema, vesiculation, and marked swelling; the skin becomes cyanotic and brawny, and necrosis follows. The affected area is covered with a dry, dark-colored, leathery, adherent mass of tissue, which may persist for months, is surrounded by a reddish inflammatory border, and is accompanied by severe pain. These lesions are chronic, lasting for months or years, and the cicatrix which eventually forms

may be covered with telangiectases. Fortunately, these severe burns are now of rare occurrence. The majority of recorded cases occurred after long exposures for skiagraphic purposes.

A chronic form of dermatitis occurs on the hands and sometimes on the face of x-ray operators, which is attended by scaling, atrophy, obliteration of the normal lines of the skin, telangiectases, alopecia, and at times loss of the nails. Ulcers and hyperkeratoses, some of which developed later into epithelioma, have occurred, and occasionally a condition simulating scleroderma has been noted.¹

Of great importance in estimating probable results are the facts that the reaction of the skin exposed to the x-rays occurs only after a period of delay, which may be prolonged for three weeks or more, and that the effects are cumulative.

Pathological action of x-rays has been studied both in man and in animals by several observers. Schlotz² concludes that: First, the rays cause a slow degeneration of the elements of the skin, in which the cells, not only of the epidermis and its appendages, but also those of the corium, may participate. This degeneration affects the nucleus as well as the protoplasm of the cell. The rays also induce, but to a much less extent, a degeneration of the fibrous elements (collagen, elastin) and of the muscles. Second, when the cellular degeneration reaches a certain point an inflammatory reaction occurs, in which the blood-vessels become dilated and an extravasation of serum and leukocytes results. The latter then seem to act as phagocytes and to destroy completely the degenerated cells. MacLeod³ adds that "the inflammatory reaction induced by x-rays is peculiar in that it occurs in a tissue the vitality of whose various elements has already been impaired by the action of the rays, and in that it is associated with greater destructive changes than those produced by actinic rays, and is apt to lead to ulceration and necrosis, and is liable to be followed by an imperfect process of repair." An agent having such properties is obviously of great value, but not without danger in its application.⁴

Apparatus (x-ray).—Two forms of apparatus are in common use, one employing an induction-coil, the other a static machine. An electric current or storage batteries are essential when a coil is selected. Either apparatus will accomplish the desired end when properly managed. The popular idea that the static machine should be used for therapeutic purposes, on account of its greater safety, is erroneous, as serious damage has been wrought by its use. A coil having a double or a triple winding in the primary, which may be connected in parallel or in series, is efficient. It should furnish a spark-gap of the length of 30 cm. Four varieties of interrupters are used: the turbine and the dip interrupters, in both of which mercury is used; the Wehnelt (or

¹ Jour. Cut. Dis., 1903, xxi, p. 52.

² Archiv, 1902, lxx, pp. 87 and 241; abstr. Brit. Jour. Derm., 1902, xiv, p. 397.

³ Brit. Jour. Derm., 1903, xv, p. 365 (with review of literature on pathological action of x-rays).

⁴ The treatment of x-ray dermatitis is considered with other forms of dermatitis.

electrolytic); and the vibratory interrupter; each of the four possesses some advantage peculiar to itself. A voltmeter, ammeter, and tachometer indicate, respectively, voltage, ampèrage, and frequency of interruptions. Lead-plate, as a rule, is interposed between the tube and the skin in the vicinity of any lesion to be treated. The lead is placed between the tube and the patient, and should have an aperture of the size of or slightly larger than the lesion to be treated, through which the rays pass. Röntgen found that lead one-sixteenth of an inch thick was impervious to all rays. Practically, however, one-thirty-second of an inch is sufficiently thick. Aluminum screens, advised by Thompson,¹ may be interposed, when treating deeper lesions, to intercept some of the rays which are absorbed superficially and which induce early dermatitis. The elimination of these rays allows the treatment to be pursued for a longer period without damage to the superficial tissues.

Technique.—A reasonably safe technique was early devised by Schiff and Freund, as follows: The coil should furnish a spark-gap of 30 cm. A primary current of 12 volts and $1\frac{1}{2}$ ampères is advised, with interruptions of 600 to 1000 per minute. The tube should be placed 15 cm. distant from the surface treated, gradually reducing the distance to 5 cm. The time of treatment in the beginning should be five minutes, this to be increased gradually to fifteen. Three preliminary exposures of five minutes each, given daily, with the tube at a distance of 15 cm., are first to be employed. If, after an interval of three weeks, no unusual reaction occurs, treatment is resumed and pursued. As there are no means of measuring exactly the quantity of radiation from a given tube, and as the reaction in each individual case must be the chief guide, a perfect technique cannot be outlined. By employing a milliampèremeter, a Benoist radiochromometer, and a Holzknecht radiometer, the dosage may be more accurately measured, these instruments being essential when the so-called single-dose method is followed.² (For details as to duration and number of exposures, distance of the tube, etc., consult the chapters devoted to the diseases in which this treatment is recommended.) Preliminary exposures with a view to testing the susceptibility of the patient should never be neglected, especially in the treatment of such disorders as acne and hypertrichosis. The difference in susceptibility of different patients to the rays is not only demonstrable, but in certain cases amounts to a dangerous idiosyncrasy.

Tubes.—The greatest problem in radiotherapy is furnished by the tube. Successful treatment depends much on the ability of the operator to recognize, to a degree at least, the condition of the tube employed. Tubes are designated as "hard" or "soft." A hard tube is one in which, the vacuum being more perfect, there is a marked resistance to the passage of the electric current; its rays have penetrating

¹ Boston Med. and Surg. Jour., 1896, cxxxv, p. 610.

² See MacKee and Remer, Jour. Cut. Dis., 1912, xxx, p. 528: The Single-dose X-ray Method.

qualities and it contains fewer of the rays absorbed superficially, and consequently the rays of such a tube affect the skin only after a number of exposures. A soft tube has the reverse effect. Its vacuum is relatively low; it offers but little resistance to the passage of the electric current; the rays produced in it are largely absorbed by the superficial tissues; and it readily produces dermatitis. The shadow-picture on the fluoroscopic screen produced by x -rays from a hard tube shows but little contrast between the flesh and the bones of the hand; while with a soft tube the contrast, for obvious reasons, is conspicuous. A newer tube emits more x -rays than an older tube. Tubes become hard by use, and if not fitted with a regulating device become inefficient. Rest softens a hard tube to some extent. The focus of the cathode rays need not be small for therapeutic work; for fluoroscopy and skiagraphy this is essential. A tube having a regulating device of some sort is preferable, as it can be softened at will.

It follows that in the treatment of superficial cutaneous diseases soft, or moderately soft, tubes are preferable, even though they may produce dermatitis if used sufficiently. It is this quality that gives them their efficiency. With such tubes a large amount of treatment is never necessary, and the reaction should be anticipated by suspending treatment before its appearance. By careful regulation of the other factors, such as the intensity of the light, etc., best results may be obtained. In epithelioma usually a moderately hard tube is advisable, the quality depending largely on the depth of the lesion and the quantity of rays usually necessary for its removal. Other elements equal, the intensity of the rays varies directly with the strength of the primary current (Röntgen), and the effect varies inversely as the square of the distance of the tube from the surface exposed. In epithelioma radiotherapy possesses the advantage of being a painless method of treatment. As pathological cells are affected and destroyed with a smaller amount of x -rays than normal cells or normal connective tissue, it follows that good cosmetic results may be obtained when the quantity of rays applied is sufficient to destroy the diseased cells without injury to other structures.

Phototherapy.—Since 1896, when Finsen published his first report on the treatment of lupus vulgaris with concentrated chemical rays of light, the therapeutic value of light has been studied both clinically and experimentally in the laboratory by many observers, and the literature of the subject has become extensive.¹

The bactericidal properties of light were demonstrated first by Downes and Blunt in 1877, and since then by many other observers. The fact is now well established that the chemical rays of light, if con-

¹ For bibliography, see *Mittheilungen aus Finsen's Lysinstitut*, Nos. 1-4 (German translations, Leipzig and Jena, 1900-4); Leredde et Pautrier, *Annales*, 1902, iii s., iii, p. 341, and *Photothérapie et Photobiologie* (monograph of 267 pp.), Paris, 1903; Freund, *Grundriss der Gesamten Radiotherapie* (monograph of 423 pp.), Berlin and Vienna, 1903; Möller, *Bibliotheca medica*, Abt. D 11 (monograph of 142 pp.); Hyde, Montgomery and Ormsby, *Jour. Amer. Med. Assoc.*, 1903, xl, p. 1; and Montgomery, *Jour. Cut. Dis.*, 1903, xxi, p. 529.

centrated and their action sufficiently prolonged, are capable of destroying the majority of pathogenic bacteria, though the resisting power of different microorganisms differs considerably. The experiments of Finsen, Bang, Bie, Freund, Stroebel, Busch, Jansen, and others have demonstrated: (1) That of all parts of the spectrum the ultra-violet rays are the most highly bactericidal, and are also most stimulating to plant and animal cells, these properties gradually diminishing in power toward the red end of the spectrum, where they are comparatively slight. (2) The power to penetrate tissue is greatest at a certain point in the ultra-red part of the spectrum, and diminishes in both directions, the ultra-violet rays being absorbed for the most part by a thin layer of glass or by the uppermost layer of the epidermis, and unable to penetrate the skin more than a millimeter. (3) The effective rays in the treatment of skin diseases are, therefore, the visible blue and violet and the immediately adjacent ultra-violet rays, since these are both bactericidal and stimulating to cells and have some power of penetration. Jansen has shown that by prolonged action (seventy-five minutes) of the light as employed at the Finsen Institute in Copenhagen, bacteria may be destroyed, in tissue exsanguinated by pressure, at a depth of 1.5 mm., and their growth retarded at a depth of 4 mm. beneath the skin. The stimulating effects of the light probably penetrate somewhat deeper.

Though the earlier studies of Widmark, Hammer, and Unna on the production of dermatitis and pigmentation by the violet rays; of Graber, DuBois, Bert, and Lubbock on the influence of violet rays on the activities of certain animals; the broader and more fundamental researches in this field of v. Sachs and Jacques Loeb; and the subsequent demonstrations of Friedländer, paved the way for the later investigations of light-therapy, to Finsen belongs the credit of having first made practical and successful use of light in the treatment of disease.

Phototherapy as employed by Finsen and his followers is based on the principle of concentrating a large number of chemical rays of light on a small area, at the same time excluding the heat-rays as far as possible. A few seconds' exposure to such concentrated light may produce a superficial erythema, but exsanguination of the area to be treated and long exposures (usually one hour) are necessary to secure deep penetration of the light and to produce an acute inflammatory reaction of the tissues. Sunlight, which Finsen employed at first, and which still is used to some extent by his followers, in summer, is too uncertain in its availability for general use, and is apparently less effective than a strong electric arc light.

The light from a powerful electric arc is condensed by means of a series of lenses so enclosed in a metal tube as to form chambers, which are filled with distilled water to absorb the heat-rays. The lenses are made of rock crystal, as glass absorbs too large a proportion of the ultra-violet rays. The collecting lenses are 7 cm. in diameter (larger sizes being difficult to obtain and very expensive), and the rays are brought to a focus about six or seven inches from the lower end of the

tube. Surrounding one of the divisions containing water is an outer jacket, through which ordinary cold water circulates, thus preventing overheating of the apparatus. In Finsen's original apparatus he employed an arc light of from 60 to 80 ampères and about 70 volts. In each quadrant of the circle around the lamp was placed a system of condensers, thus permitting the treatment of four patients with one light. This apparatus is suitable for institutions where numbers of patients are to be treated daily. A smaller lamp has been devised by Finsen and Reyn, in which they use practically the same system of condensers, but by employing one lens of shorter focal distance and by so directing the arc that the strongest rays fall directly on the first lens, 20 ampères and 55 volts give results equal in every way to those obtained by the larger apparatus. The lamp is mounted on an adjustable stand, and is much cheaper to install and maintain than the original apparatus, and more suitable for use outside of large institutions.

In treating a given area, the patient should be so placed that the light falls perpendicularly upon the surface to be treated, which is brought near enough to the lamp so that the rays are concentrated in a circle from one-half to one inch in diameter. Throughout the *séance* this position must be accurately maintained, and the area under treatment must be exsanguinated. The tissues are kept bloodless by means of constant pressure applied by an attendant with specially prepared compressors. These are composed of two quartz lenses so held together by a metal rim as to leave between them a narrow space, through which cold water¹ constantly circulates, to prevent the heating of the lenses. According to the contour and location of the area to be treated, the lens which comes in contact with the surface may be plane, slightly concave, or convex in varying degrees. For certain sites, as, for example, the inner canthus of the eye, compressors of special shape and size are made. Though in Finsen's Institute these compressors are usually held in place by an attendant, who thus must give her whole time to the treatment of one patient, they are made so that they can be fastened in place by means of a tape or elastic bands. We find that by properly adjusting these bands and by carefully placing the patient (frequently with the aid of a photographer's head-rest) so that the part to be treated is well supported, equally good results are obtained and at much less expense than when each patient requires the constant attention of a nurse or attendant.

The water in the compartments between the condensing lenses absorbs most of the heat-rays (nearly all of the ultra-red), but transmits not only the ultra-violet rays, but also nearly all of the visible spectrum. Consequently, if the light be too concentrated, the heat may be sufficient not only to cause pain, but also to burn the skin—an effect that should be avoided, as it means the destruction of some normal tissue and the consequent production of larger and deeper scars. The amount of concentration which different patients and

¹ The space is so narrow that distilled water is necessary.

different conditions will tolerate varies considerably. It is desirable to use the rays as strong as possible without burning.

The frequency of the applications and the duration of each vary for different conditions and for different individuals. For superficial lesions which can be perfectly exsanguinated, half-hour exposures are often sufficient. For deep-seated lesions from one to two hour *séances* may be necessary. On each area the treatment is repeated, when necessary, as soon as the reaction has subsided, which it does usually in from one to two weeks.

Following each treatment an inflammatory reaction occurs in from six to twenty-four hours, varying in degree, according to the intensity and duration of the treatment, from a simple erythema to a vesicular or bullous dermatitis, which is sharply limited to the area to which the light was applied, though when the reaction extends at all below the surface there is a surrounding narrow zone of edema. The outline of the area of reaction thus affords a ready test of the accuracy with which the compressor and light were kept in position during the treatment. The vesicles and bullæ dry and form crusts, which ultimately fall, leaving only the new-forming epidermis. The process requires as a rule from eight to twelve days. The inflammation produced by the light causes no necrosis and no destruction of normal tissue, all of which is conserved. Hence the inconspicuous scars produced and the value of the treatment from a cosmetic point of view. Moreover, the light may be applied freely not only to the morbid area, but also to the apparently normal tissue surrounding it, thus insuring destruction of advancing pathological processes which cannot be recognized clinically. In the normal skin, the reaction on subsiding is followed usually by more or less pigmentation, which usually disappears in ten days or two weeks. Another effect of the light upon normal skin is to produce a slight dilatation of the superficial vessels, which may persist for six months or more. The sole clinical manifestation of this condition is the readiness with which slight external irritation produces an erythema of the part.

The success of the treatment depends largely upon the care with which the technique is carried out in all details. It is especially important that the lenses, both of the condenser systems and of the compressors, be kept absolutely clean. The latter should be cleansed with antiseptic solutions after each treatment. The distilled water in the chambers of the condensers should be changed often enough to keep it free from particles of dust or dirt, and air-bubbles should not be allowed to collect on the lenses.

Though the light treatment has been used most successfully in the treatment of lupus vulgaris and other forms of cutaneous tuberculosis, it is of value in the treatment also of lupus erythematosus, alopecia areata, rosacea, vascular nevi, and some chronic inflammatory cutaneous diseases of circumscribed areas. The special technique appropriate for each of these conditions is considered with the general treatment of each. Phototherapy is limited in its applicability by the fact

that the rays can penetrate exsanguinated tissue only, and this but to a limited depth. The area treated at one time is small, averaging less than an inch in diameter. Consequently, when the disorder to be treated is extensive, the method as now applied is both tedious and expensive.

Numerous lamps have been invented in the effort to produce one with which more rapid results can be obtained and with less expense. They may roughly be divided into two classes:

In the first class, of which the Lortet-Genoud and the London Hospital lamps are the best-known examples, the source of light can be brought within two inches of the region to be treated, the need of a condenser being thus done away with. The patient is protected from the light by a hollow shield, in the centre of which are two rock-crystal lenses, front and back, between which cold water constantly circulates and absorbs the heat-rays. The part to be treated is exsanguinated by pressing it firmly on the face of the front lens. An arc light is employed having carbon electrodes, an ampèreage of 10 or 12, and a voltage of 55. These lamps are in some respects more convenient and less expensive to use than even the Finsen-Reyn lamp, and give good results in superficial lesions, but the light from them has not the penetrating power of that given by lamps which have a series of condensers and employ arc lights with higher ampèreage.

Lamps of the second class, of which there are many, are constructed with the aim of furnishing ultra-violet rays in quantity. For this purpose iron or other metal electrodes, or the high-tension condenser spark, have been used. These lamps are small, convenient, of low ampèreage (1 to 4), and therefore less expensive to install and to maintain. Some of them are powerful in destroying surface-cultures of bacteria and in exciting inflammation on the surface of the skin. As they depend for these effects upon the ultra-violet rays, which are absorbed by the uppermost layers of the epidermis, they have no influence upon lesions situated at all deeply in the skin.

Radium.¹—The first radio-active substances to be isolated were Becquerel-rays, from uranium salts, in 1896. In 1898, Madame Curie and M. Schmidt independently discovered similar rays in thorium. In 1900, Professor and Madame Curie discovered two new bodies, radium and polonium, the latter being much weaker than the former. In the same year actinium was discovered by Debierne, and in 1904 radio-thorium was discovered by Ramsay and Hahn.

Of these various radio-active substances, radium is the one chiefly employed in a therapeutic way. The strength of radium salt is determined by its power of ionization. Taking uranium as the unit of measurement, radium possesses an activity of about 2,000,000. Radium-bromid is a well-defined salt from which all other salts—carbonate, sulphate, nitrate, stearate—are prepared. The bromid, chlorid, and nitrate are soluble, and the sulphate and carbonate insoluble.

¹ Wickham and Degrais: Radiotherapy. Translation by Dore, 1912. (To this work the author is much indebted.)

The sulphates are those employed with varnish, either on metal or cloth, for therapeutic purposes. As a rule, the radium salt is mixed with a barium salt in the proportion of one to four, which results in a preparation having a radio-activity of 500,000.

From radium at least three distinct kinds of rays are evolved, the principal ones being the Alpha, Beta, and Gamma. The Alpha rays constitute the major portion, about 90 per cent. They are readily absorbed, may be deflected by a magnet, and have only slight penetrating power, a thin layer of metal or rubber being sufficient to intercept them; and therapeutically they induce a dermatitis.

In the Beta group several varieties relative to penetrating power occur, some of which are comparatively soft, others hard. Some of these rays have great penetrating qualities and may be detected through 5 mms. of lead. It is possible also to influence these rays with a magnet.

The Gamma rays closely resemble *x*-rays. They cannot be deflected and they have marked penetrating power. They are able to traverse as much as 10 cms. of lead, which is much greater than the penetrating power of *x*-rays. They pass through the bony skeleton without producing a trace on the fluoroscopic screen.

The varying penetrating qualities of the rays are taken advantage of therapeutically, and filters may be used to eliminate the more superficial rays when desired. A screen of cotton-wool or of aluminum will intercept the Alpha rays. Screens of greater density are required for the others. In the free state the Alpha rays constitute 90 per cent. of the total radiation, the Beta 9 and the Gamma 1. This proportion is changed when the salt is mixed with varnish for therapeutic purposes, as the varnish acts as a screen. From such a source the Alpha rays are reduced to from 1 to 10 per cent.; the Beta rays predominate, in the proportion of from 80 to 90 per cent.; and the Gamma have a percentage of from 1 to 10; so that in treatment the activity emitted is largely in the form of Beta rays.

The method of employment is either to have the radium salt in tubes or spread on metallic plates or pieces of linen and held in position by a special varnish. The tube is made of glass and sealed, and is then enclosed in a second tube of gold, silver, or platinum, of a thickness depending upon the intensity of the radio-activity desired, the tube thus acting as a filter. It is possible by this form of apparatus to treat *in caritis*, as in the mouth, and also to insert the tubes into tumors. The metal plates upon which the radium salt is held in position by a varnish are made in various shapes, such as flat, concave, convex, cylindrical, spherical, or laminated, to fit the various portions of the surface or cavity to be treated. In those having a linen base the shape naturally is readily changed. In either case there is presented a perfectly smooth, slightly shiny surface, of brownish color, due to particles of radium which show through the transparent varnish. Their color, however, varies with age from yellowish early to brown or black later.

The reactions produced by radium are similar to those induced by *x*-rays. Varying grades of dermatitis, including superficial and deep ulceration, may follow its use. Radium is of special value in the treatment of nevi. It is also employed in several diseases where *x*-rays are valuable, such as epithelioma, keloid, and chronic inflammations.

Liquid Air and Solidified Carbon Dioxid.¹—These methods of treatment have been developed within recent years. Their action is essentially a caustic one, induced by intense refrigeration. Liquid air is difficult to obtain and hence is not always available. It is kept in double-walled glass containers, which are not sealed, as evaporation must be allowed to occur to prevent explosion. It is applied to the skin on cotton swabs with moderate pressure. The tissue is immediately frozen white, and is very hard and depressed. Within a short period the circulation is resumed, at which time some pain is experienced. Swelling, with redness and bullous formation, soon follows. Later changes depend upon the amount of destruction induced. Carbon dioxid snow, suggested by Pusey, is more convenient, readily obtained, and fulfills much the same requirements. It is only about one-half as cold. It is obtained from the ordinary liquid carbon-dioxid containers, and when the snow is collected it may be moulded into the required shape and applied. These agents are used in the treatment of nevi and benign growths, lupus erythematosus, and small epitheliomata.

¹ Dade, C. T., *Trans. Amer. Derm. Assoc.* for 1905. Whitehouse, H. H., *Jour. Amer. Med. Assoc.*, 1907, xlix, p. 371. Trimble, W. B., *Jour. Cut. Dis.*, 1907, xxv, p. 409; *New York Med. Record*, July 8, 1905. Pusey, W. A., *Jour. Amer. Med. Assoc.*, 1907, xlix, 16, p. 1354. White, C. J., *Jour. Cut. Dis.*, 1908, xxvi, p. 505. Heidingsfeld, M. L., *Ohio Med. Jour.*, 1908, iv, p. 466. Zeisler, J., *Zeitschrift*, 1908, xv, p. 409, and *Jour. Cut. Dis.*, 1909, xxvii, p. 32.

CLASSIFICATION.

THE numerous attempts which have been made to classify diseases of the skin according to their nature and relations have been in response to the generally recognized demand for a systematic arrangement of all scientific facts. As regards dermatology, not only have these attempts been numerous and based upon different principles, but the results which they have accomplished have also been in the highest degree divergent. No classification yet devised has secured general acceptance. While it is certain that no one system of classification has been perfect, and that each has exhibited defects, it is equally true that of the large number each has possessed some merit of its own. No perfectly satisfactory classification of cutaneous diseases can be made until the knowledge of disease of the skin has been greatly enlarged.

One of the most acceptable of the systems thus far proposed is that of Hebra. In it cutaneous disorders are arranged in the following nine classes:

- CLASS 1. Disorders of Secretion.
- CLASS 2. Hyperemias.
- CLASS 3. Exudations.
- CLASS 4. Hemorrhages.
- CLASS 5. Hypertrophies.
- CLASS 6. Atrophies.
- CLASS 7. New Growths.
- CLASS 8. Neuroses.
- CLASS 9. Parasites.

Since this classification was devised by Hebra none has been proposed which compares in ingenuity with the arrangement made by Auspitz. The principle of this classification is to place together those diseases and groups of diseases which present a clinical unity, the general pathological process being the predominant characteristic for selection; individual characteristics, such as symptoms, localization, and anatomical peculiarities, being brought thus predominantly forward when coinciding with the real nature of the class, the group, or the skin-disease in question.¹ Auspitz's nine classes are:

- 1. Simple Inflammatory Dermatoses; 2. Angioneurotic Dermatoses; 3. Neurotic Dermatoses; 4. Stasic Dermatoses; 5. Hemorrhagic Dermatoses; 6. Idioneuroses; 7. Epidermidoses; 8. Chorioblastoses; 9. Dermatomycoses.

¹ System d. Hautkrankheiten. Wien, 1881.

Under these classes, by the aid of divisions and subdivisions, an elaborate scheme is presented which embraces not only all cutaneous diseases, but also all pathological processes recognized in the skin. The mere presentation of this system has been followed by an advance in the nosology of cutaneous medicine more satisfactory than any since the contributions to this subject by Hebra.

Auspitz's classification, however, is open to various objections on the part of the student of dermatology. It is elaborated to the extent of placing the names of some diseases in more than one family, and hence is confusing to the beginner. It is better adapted to the needs of the expert than of the student, for it introduces to the study rather of morbid processes in the skin than of the complexus of those processes which are recognized in disease.

Whether the principle of classification be anatomical, etiological, or pathological; whether it be based on the processes actually occurring in the skin, or on those deeper factors and forces which operate centrifugally upon the skin, and on which that organ depends for all its functions and even its existence; whether it proceed etilogically from causes which are immediate or those which are remote, it is easy to see that, as knowledge in each of these directions enlarges, the exact position of any one disease in any given classification must be rendered insecure. Never was this observation more suggestive than at this day, when the pathogeny of numerous skin-disorders is revealed in the light thrown on the subject by the discovery of hitherto unknown organisms.

Several recent writers have contented themselves with an alphabetical indexing of the names of skin diseases as an order useful simply for reference.

The arrangement of titles of diseases of the skin in this treatise is a modification of the scheme first proposed by Hebra on the lines recognized by the American Dermatological Association in its classification adopted in 1884. As the arrangement stands today, it should be regarded as a mode of grouping diseases for the convenience of the student, rather than as an attempt at a scientific classification of diseases of the skin.

DISEASES OF THE SKIN.

CLASS I.

HYPEREMIAS AND INFLAMMATIONS.

ERYTHEMA.

ERYTHEMA denotes redness of the skin. It may be of varying shades, from bright scarlet to a deep bluish-red. In cutaneous medicine the term is used, unfortunately, both to describe a symptom and to indicate specific dermatoses; in the latter case some qualifying term being added. It is usual to divide the erythemas into two main groups: one form due to hyperemia, which is usually short-lived and induces no changes in the skin; the other form the exudative erythemas, accompanied by the changes induced by inflammation. Sharp distinctions cannot be drawn between the two kinds, as individual members tend to overlap.

Erythema Hyperemicum (seu Simplex).—Erythema simplex is a coloration of the skin in various shades of redness, diffuse or circumscribed, temporarily disappearing under pressure, the lesions differing in size, hue, and shape according to the extent and degree of the hyperemia by which they are induced.

Simple erythema is seen in the phenomenon known as blushing. Ordinarily, this is a purely physiological and transitory hyperemia due to emotional causes. Cases occur in which the hyperemia thus induced persists for hours, together with palpitation and other evidences of circulatory disturbance. Here the erythema is symptomatic of either physical or mental disorder. With the former may be classed those disorders in which portions of the face remain flushed after eating, exercise, exposure to heat, etc.

Under idiopathic erythema have been classed the simple forms for which no cause is recognized. In many cases, a careful search will disclose the disease or condition of which the erythema is but a symptom. The cause may be found in external irritation too slight and transient to produce a dermatitis, in disturbances of the alimentary canal, in the nervous irritability of children due to teething, in a drug-idiosyncrasy, or in one of many derangements of the general economy. Again, the erythema may be a more or less important diagnostic symptom of graver constitutional diseases, as in the exanthemata and typhoid fever. The color in simple erythema may vary from a delicate pink or rose shade to a dark-reddish hue, which may be transitory or

Roseola Infantilis is sometimes described as a distinct affection, in which there are fever and constitutional disturbance lasting for a few hours or even a few days. The exanthem varies greatly in extent and distribution. It is usually macular or punctate, but may be finely papular. It is most common on the trunk, but may appear on other parts of the body. It may closely simulate scarlatina or measles. This eruption is generally a manifestation of some systemic or local disorder.

FIG. 34



Toxic erythema.

Symptomatic Passive Erythema is usually characterized by a cyanotic, purplish or darker hue of the integument, resulting largely from accumulation in excess of carbon dioxide in the blood. The temperature of such skins is either normal or below the normal standard, as in those cases in which gangrene ensues. There are many conditions in which these symptoms are noted, including derangement of the blood-vessels from imperfect innervation, direct pressure, or disease of the heart or vascular walls.

These erythemas may be either circumscribed in area or generalized.

The term *livido* is applied to circumscribed regions of passive hyperemia. The nose, cheeks, fingers or toes may thus be affected, as in erythema pernio. The so-called *symmetrical gangrene* of the fingers belongs to the same category. Cardiac cyanosis or *morbus cæruleus* is a name given to a generalized dark-blue discoloration of the entire surface, due to a continued patency of the foramen ovale.

Erythema of Jacquet.—This is an eruption of the napkin region of infants, whose importance has recently been emphasized by Adamson,¹ the following description being largely taken from his work. On account of a close resemblance in certain cases to congenital syphilis, the disease should be recognized. The cases are divided into four groups: (1) simple erythemas; (2) erythematovesicular or erosive forms; (3) papular or post-erosive forms; (4) ulcerating forms. The lesions are situated on the convex surfaces, between the flexors, and may occupy or be situated upon the inner parts of the thighs, the perineum, and genitals, or extend over the buttocks, the posterior surfaces of the thighs, the lower part of the abdomen, and upon the calves and heels. The erythema is described as having a deep-red and shining appearance, and its selection of convex areas, leaving the flexors, is striking. In the more severe cases, the three subsequent subdivisions occur, consisting of vesicles, papules, or ulcerations. The distribution of the eruption upon the prominent convex surfaces suggests local irritation by wet or soiled napkins as a factor in these eruptions. Adamson suggests a disturbance in the vasomotor system as a predisposing factor. In a patient recently seen by the author, malnutrition played an important role in the question. This was a typical case, and strongly suggested congenital syphilis. It is said that in children's clinics these cases are far from uncommon. There is no evidence that subjective sensations are present.

Pathology.—The histological changes described by Ferrand and concurred in by Adamson consist of a spongioid transformation of the prickle-cell layer, desiccation, acanthosis, parakeratosis, cell-exudation, and dilatation of the vessels in the papillary layer of the corium.

Diagnosis.—The important question is the recognition of the fact that the disease is not a manifestation of syphilis. The absence of lesions about the mouth and lips, and other signs of congenital syphilis, readily settles the question.

The diagnosis of simple erythema is usually not difficult, since without exudation there is an absence of all other elementary or secondary lesions of the skin. The chief point or difficulty lies in the establishment of a cause.

Treatment.—In the management of the simple forms of erythema, the removal of the cause is the chief object. Alkaline washes, boric-acid solution, zinc-oxid and liquor-calceis lotions, or dilute black-wash, may be followed by the application of a dusting-powder; or the last

¹ Brit. Jour. Derm., 1909, xxi, pp. 41-47, inc.

may suffice. Exclusion of irritants, such as washing the parts with soap and water, is advisable.

Erythema Scarlatiniforme.—**Synonyms:** Scarlatinoid Erythema, Desquamative Scarlatiniform Erythema, Scarlatinoïde, Erythema Punctatum, Roseola Scarlatiniforme, "Scarlet Rash," Dermatitis Scarlatiniformis Recidivans. Fr., Erythème infectueux.

Definition.—Erythema scarlatiniforme indicates an eruption arising from several causes and varying considerably in character, but having a tendency to simulate the rash of scarlatina. This condition has been described as an idiopathic disease, but it is very often demonstrated to be a symptom only of other disorders. Besnier, Brocq, and other French authors describe an *erythème scarlatinoïde*, which is acute in type, and which is always secondary to other infectious diseases, to autotoxemia, or to medicinal or food toxemia; and an *erythème scarlatiniforme desquamatif*, which is subacute in type, and which may be idiopathic, secondary to other infectious diseases, or produced artificially by drugs.

Symptoms.—In the acute type, which is the more common of the two forms, the rash may be preceded by a day or two of fever and other evidences of constitutional disturbance, frequently lapsing with the occurrence of the eruption, or it may appear suddenly without premonitory symptoms. The exanthem spreads rapidly, and in a few hours, or at most in two or three days, reaches its full development. The eruption is commonly universal, or at least generalized, but may be more limited in distribution. The rash may be punctiform, macular, or diffuse, and the color may be any of the shades of red, but it is usually a bright scarlet. In some instances, the appearances are those of a typical scarlatinal rash. There are usually some fever (100° to 103° F.), malaise, and other constitutional disturbances, that may vary greatly in intensity, depending upon the cause of the disease in that particular instance. The mucous membrane of the mouth, the tongue, and the fauces may be reddened or be denuded of epithelium, but is not swollen. The nails and hair may be shed, but only in exceptional cases. Desquamation usually begins in from two to six days, sometimes before the disappearance of the rash; and it may even occur on surfaces which had not perceptibly been reddened. The scales are usually furfuraceous, but they may be large and abundant. In rare instances, the entire epidermis of the hand may be shed in glove-like form. Complete involution may require from a few days to several weeks. Rarely, the process terminates in a persistent exfoliative dermatitis. Recurrences are common, but in some instances may be prevented by the discovery of the active cause.

The subacute forms of erythema scarlatiniforme differ from those described above in that constitutional disturbances are less, the rash has a greater tendency to be universal, and, together with the desquamation, may persist for weeks or months, recurrences being common. At times they are so frequent as to make the condition practically continuous and clinically indistinguishable from the milder forms of dermatitis exfoliativa.

Etiology.—Idiosyncrasy is a most important factor in the etiology of those forms of erythema which appear in certain predisposed individuals as a result of causes totally insufficient to produce the same phenomena in most persons; as, for example, in persons exceptionally susceptible to quinin administered by the mouth. The exciting factor is usually if not always some form of toxemia. Among many causes reported are infectious diseases, septicemic conditions, toxemias of varied origin, renal disease, peritonitis, rheumatism, ague in children, gonorrhea, abscess, empyema, serums, tuberculin injections, sewer-gas poisoning (Crocker), certain articles of food, and many drugs, the most important among the latter being mercurial inunctions. The author has seen a typical case following the application of iodoform, and this case had recurrences without renewal of the original cause.

Diagnosis.—It is important to distinguish this rash from that of scarlet fever. Commonly, the diagnosis is not difficult, but occasionally the greatest difficulty is encountered. As a rule, in erythema scarlatiniforme the constitutional symptoms are slight; the rash appears rapidly, beginning irregularly on any part of the body; the lesions are exclusively cutaneous; desquamation begins early (in from two to three days), and is extensive; the fauces, though red, are not swollen; and there is absence of the "strawberry tongue," of leukocytosis, and of all history of contagion. Occasionally, the rash may resemble that of measles or röteln; but the history of the case and the absence of other symptoms peculiar to these affections should make the diagnosis clear. As a rule, an examination of the rash alone is insufficient, and a diagnosis of erythema scarlatiniforme should not be made until other exanthemata have been considered and excluded.

Treatment depends entirely on the underlying cause or condition. Toxins present should be eliminated as rapidly as possible. The eruption itself rarely calls for treatment. If there be itching or burning sensations, a simple dusting-powder, with or without an anti-pruritic or a soothing lotion or ointment, may be used to make the patient more comfortable. In extensive cases, the unguentum aqua rosæ gives much relief. In the subacute recurrent cases, careful search should be made in the alimentary tract, and good results have been obtained by so regulating the diet as to promote free elimination and prevent the accumulation of waste products.

Prognosis.—As a rule, the eruption disappears promptly and the general health of the patient is unaffected. Recurrences are frequent, and in some cases terminate in a more or less persistent exfoliative dermatitis.

Shedding of the Skin (*Deciduous Skin, Keratolysis*).—Cases are reported of individuals whose skin is shed periodically, like that of a serpent. Dr. Hyde had the opportunity of observing the symptoms in the case reported by Frank and Sanford¹ during several of the

¹ Amer. Jour. Med. Sci., August, 1891.

periods in which the patient's skin was exfoliated. The subject was thirty-three years of age, well formed and apparently in perfect health. No cause for the skin shedding could be found. He stated that ever since he could remember, and certainly since he was eight years old, he had had peculiar symptoms, which began between 3 and 9 P.M. of July 24 of each year. He would suddenly experience a feeling of lassitude or weakness, followed by muscular tremors, nausea, and vomiting, with rapid rise in temperature. Accompanying these symptoms, the mucous membranes were hyperemic, and the skin became hot, dry, and destitute of perspiration. After three or four hours, the acute symptoms began to subside, but the skin remained red for thirty-six hours longer. The shedding of the skin began usually on the second or third day, and was completed in from three to ten days. The mucous membrane of the tongue and mouth exfoliated on the third day. The epidermis was removed from the trunk and arms in large sheets on the sixth day, and from the remainder of the body, except the hands and feet, within the next three days. Complete casts of the hands and feet were shed on the seventeenth day, and the nails all came off within a month from the beginning of his illness.

This case was observed the following year and reported by Sligh.¹ His report confirms the facts above recorded. Similar cases are reported by Stelwagon,² Stone,³ and others. Cases of constant exfoliation of the skin rather than periodic have occurred. These are rare, and are described under the term *keratolysis exfoliativa congenita*.

Erythema Pernio.—**Synonyms:** Pernio, "Chilblains." Ger., Frostbeule. Fr., Engelure.

Definition.—Erythema pernio occurs in persons having a feeble circulation, and on parts of the body which are remote from the heart (fingers, toes, ears, and nose). It occurs usually in the young and the very old. Permin⁴ calls attention to its frequent occurrence in the tuberculous. The redness is either of a light or dusky shade; is accompanied by tenderness, itching or burning sensations, especially when the part is brought near an artificial source of heat; and may be the origin of exudative and other affections of the skin, though the ulceration and sloughing which occur in extreme cases are really the results of freezing the organs, rather than of simple exposure to cold when the circulation is impaired. The disorder recurs in cold weather, clearing up in the warmer seasons. The impaired vitality of the skin in these cases, due to vascular disturbance, and the edema present render the skin liable to severe injury from small cause.

Diagnosis.—The diagnosis is readily made when one observes that the redness disappears on pressure, and also that the parts are actually

¹ Internat. Med. Mag., 1893, p. 463 (two plates).

² Diseases of the Skin, 5th Ed., p. 143.

³ Jour. Amer. Med. Assoc., September 1, 1900, p. 557 (two cuts).

⁴ Hospitaltidende, 1903, xviii, Copenhagen; abstr. Brit. Jour. Derm., 1903, xv, p. 376.

cool rather than hot, the coolness being appreciable by the touch. Not rarely the involved surfaces are both cool and moistened with sweat. Pernio may closely resemble an early stage of lupus erythematosus, but the latter does not vary regularly with the seasons, as does pernio, which usually disappears in summer and reappears in winter. The two conditions are at times related, as individuals are seen with pernio of the hands and feet and lupus erythematosus of the face. Cases are recorded in which the site of a recurring pernio has become the seat of a typical lupus erythematosus.

Treatment.—The treatment of pernio should be directed to the improvement of the circulation and general health. Warmer clothing to protect the affected parts, together with active exercise, may do much to prevent the recurrence of the disease. Fowler's solution is considered a prophylactic if given in small doses at the beginning of cold weather. The local treatment is by brisk friction and stimulating lotions, such as camphorated soap-liniment; acetous, spirituous, and vinous lotions; or the use of the ordinary bay rum of the shops. Afterward the part should be painted with a 50 per cent. solution of ichthyol, well dusted with talcum powder, and bandaged or wrapped in cotton. The severer forms of the disease are considered as a dermatitis calorica.

Erythema Intertrigo.—**Synonyms:** Intertrigo, Eczema Intertrigo, Chafing. Fr., Erythème intertrigo.

Definition.—Erythema intertrigo is a hyperemic condition of those cutaneous and muco-cutaneous surfaces which are in constant apposition, and between which there is a hypersecretion and retention of sweat.

Symptoms.—The erythema is limited to parts of the integument which lie in contact with each other. The sites of such contact in the human body are the axillæ, the groins, the cleft between the nates, the intermammary and inframammary spaces in women, the superior and inner faces of the thighs, the scroto-femoral and the labio-femoral clefts in the sexes respectively, the flexures of the joints, and in especially obese individuals all those parts where the integument is thrown into fleshy folds, as about the neck of infants, and even over the crest of the ilium in fat subjects. In these localities, the disorder, beginning as an erythema traumaticum, proceeds by its irritative effects to stimulate the secretion of sweat, which is freely poured out between the adjacent folds of the skin and may there be imprisoned temporarily. The surface, heated and reddened, is also somewhat macerated by the effused perspiration, and the latter, when chemically altered, as it is frequently under these circumstances, adds still further to the original disorder. The ground is thus well prepared for an exudative process, which not infrequently supervenes in the form of a dermatitis; but the disorder may be limited to mere hyperemia with hyperidrosis, and disappear before the supervention of actual inflammation. Superficial abrasions of the macerated epidermis occur, and one such abrasion is always especially significant. It is the linear and superficial excoriation which marks the line of deepest contact of the two apposed

surfaces of the skin at the bottom of the angle formed by the two. An offensive odor usually proceeds from the part, in consequence of the chemical changes in the secreted fluid. The secretions of an intertrigo stain but do not stiffen the linen of the patient, and they thus differ from the serous fluid poured out in an exudative dermatitis. The subjective sensations are those of heat and tenderness.

Etiology.—The disease is chiefly induced by heat, friction, and moisture. These causes occasionally coöperate. The heat may be merely that of the natural temperature of the body, or it may be increased by that due to season or climate. The friction may be merely that originating between the surfaces in apposition, or may be increased by clothing or other articles worn next to the skin. The moisture which produces maceration of the epidermis is the sweat-secretion, this being stimulated by heat and friction. As aggravating causes may be named physiological excretions and secretions retained in contact with the surfaces affected with an intertrigo. Thus, the feces, the urine, the milk in nursing women, retained lochial, menstrual, and similar discharges, and glycosuria are all efficient in this regard, and are particularly likely to induce that form of dermatitis to which the intertrigo then plays a subordinate part. Fleishy and gouty persons chiefly suffer from these accidents.

Diagnosis.—The recognition of a simple erythema intertrigo is a matter of no difficulty if regard be had to the exciting and aggravating causes enumerated above and to the special localities in which such hyperemia generally originates. If an eczema or a dermatitis supervene, the fact will appear from increased subjective sensations (usually severe itching), from an infiltration of the affected integument, and from the appearance of those lesions and discharges which are significant of these forms of inflammation of the skin. It must be remembered that transition from a simple erythema to a dermatitis of these regions is of frequent occurrence. Erythema intertrigo may occur as a mild form of dermatitis seborrheica. The disease is to be differentiated, also, from tinea cruris, the latter being more inflammatory, exhibiting scaling, and under microscopic examination of the scales an epidermophyton fungus is found. In babies, congenital syphilis and the erythema of Jacquet are to be differentiated. The deeper involvement by both of the latter disorders, as a rule, and concomitant symptoms in one of them, serve to differentiate them.

Treatment.—Intertrigo is an exceedingly common affection of the skin, and it occasionally proves of great annoyance to those suffering from it. Gouty patients always require limitation of the diet, and often also medication with alkalies and mercurial cathartics.

The affected surfaces should be cleansed gently by ablution with soap and warm water, and the offensive odor of the secretions remedied by the addition to the water of a weak solution of formalin, of phenol, or of the dilute liquor sodæ chlorinatæ. The parts are then to be carefully dried with a freshly laundered towel or soft gauze, and afterward one of the dusting-powders very thoroughly applied. To be of

service, these powders must be impalpable, and, if compounded by a druggist, be sifted through fine silk bolting-cloth. The articles chiefly used for this purpose are zinc stearate with acetanilid, bismuth, starch, zinc oxid, French chalk, lycopodium, or, when an antipruritic effect is desired, camphor. Combinations of several of these are at times effective. The formula of McCall Anderson is highly esteemed:

R—Zinci oxid. pulv.,	℥ss;	16	
Camphoræ pulv.,	℥jss;	6	
Amyli pulv.,	℥j;	32	M.
Sig.—Anderson's dusting-powder.			

For the purpose of absorbing excessive perspiration, magnesium carbonate is the most effective of all the powders.

The following is the formula for a dusting-powder recommended by Klamann:¹

R—Talc. venet. pulv.,	℥v;	20	
Acid. salicyl.,	gr. iij;	6	20
Magnes. ust. subtil. pulv.,	℥jss;		M.
Sig.—Dusting-powder.			

Finely bolted starch answers well alone or in combination with some of the other articles above named. Unna's salve-muslins and pastes will be found effectual and neat applications in many forms of inter-trigo.

The affected surfaces of the skin must also be separated in order to prevent further friction. A thin strip of lint, gauze, antiseptic cotton, or medicated wool may be used for this purpose, and must be inserted as far as the deeper portions of the cleft in which the secretion chiefly forms. Occasionally, it will be found useful to anoint this absorbent layer with borated cold-cream salve or with vaselin. Where an astringent effect is desired, lycopodium or other dusting-powder may be compounded with tannin, alum, or similar substances. The list of lotions also at times may be consulted with advantage. Thus, cologne-water, saturated aqueous solutions of pyoktanin blue, weak spirit lotions containing tannin, aromatic wine, or zinc oxid and lime-water may each be serviceable. Lastly, equal parts of lime-water and olive-oil, spread thickly upon linen, will possibly give more relief than other articles named, the chief objection to it being the consequent soiling of the patient's linen.

Erythema Multiforme.²—**Synonyms:** Erythema Exudativum Multiforme. Fr., Erythème polymorphe.

Definition.—Erythema multiforme is an acute, inflammatory, exudative disease, characterized by crimson-red or purplish-red macules, papules, or tubercles, with the occasional appearance of vesicles or pustules, the lesions being variously grouped or isolated, frequently

¹ Hebam. Kalend., Obstet. Gazette, March, 1882.

² Symposium on the Toxic Dermatoses, Jour. Cut. Dis., 1912, xxx, pp. 119-167, inc. Discussion on Erythema Multiforme by members of the Royal Society of Medicine, London, Brit. Jour. Derm., 1912, xxiv, pp. 429-445, inc.

accompanied by general symptoms, and usually due to a systemic disturbance. A clear conception of this remarkable disorder may be gained by studying it first as it appears in mild form, with superficial lesions, usually situated on particular areas of the cutaneous surface, prone to recurrence, practically limited to the skin in its manifestations, and of unknown etiology; second, as a symptomatic erythema of several diseases of known infectious nature; third, as a surface expression of visceral disease; fourth, as cutaneous manifestations produced by the ingestion of many different drugs, and the injection of serums; and, finally, as a group of cases presenting the erythema multiforme complex, but of such severe grade that some difficulty is experienced in distinguishing them from certain forms of pemphigus.

FIG. 35



Erythema multiforme.

Symptoms.—The most common lesions are edematous looking macules, flattened papules, and large, flat nodosities. Vesicles and bullæ develop in some cases. While multiformity is the rule, one type of lesion usually predominates in each case. The eruption is nearly always symmetrical, and is usually found on the dorsum of the hands and feet, the legs and forearms, and often on the face and neck. It occurs exceptionally on other parts of the body, and rarely upon the mucous membrane of the mouth, nose, and conjunctiva. It has been seen on the sclera.

From the beginning, the lesions are more or less flat, elevated, and edematous. The eruption, which is generally recognized in well-defined patches, usually begins with pinhead- to finger-nail-sized macules of a darkish-, bluish- or purplish-red shade, that lose their color upon pressure, and in the course of some hours exhibit tumefaction in various degrees, thus producing the papules, tubercles, and nodes already mentioned. In some cases there is a tendency to a

PLATE II



Erythema Multiforme, Circinate Type.

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PLATE II



Erythema Multiforme, Circinate Type.

flattening and widening of the lesions to the point where they closely resemble a floridly tinted condyloma. The disease may persist for

FIG. 36



Erythema multiforme.

FIG. 37



Erythema multiforme, iris lesions. (Fordyce.)

but a few days, but in severe cases it may last for several weeks or months. The average simple case runs its course in from two to four weeks. Recurrent attacks through a period of years are not uncommon, and these are likely to appear in the spring and autumn. At the height of the exudative process, there is usually an efflux of the coloring matter of the blood into the skin which is the site of the several lesions; and thus are produced the singular shades of reddish-black, purple and red, blue and red, yellow and orange, and black and blue that are characteristic of simple bruises of the extremities, when the

FIG. 38



Erythema bullosum. (Howard Morrow.)

injury has been sufficient to cause extravasation of blood. The lesions occur in various shapes, sizes, and shades, and the number of names used to designate their several appearances require explanation.

The subjective symptoms are exceedingly mild and are quite out of proportion to the severity of the eruptive manifestations, slight burning and smarting occasionally being present.

The term *erythema annulare* (or *circinatum*) is employed to designate the lesions having a depressed centre and an erythematous margin, forming a ring. Occasionally, these rings are arranged concentrically. When several rings coalesce by peripheral extension, gyrate figures are

formed, and this is termed *erythema figuratum*. *Erythema marginatum* describes a form in which a distinctly elevated and well-defined marginal band is left as the sequel of an erythematous patch. *Erythema papulatum* (or *papulosum*) and *erythema tuberculatum* (or *tuberculosum*) are those forms in which occur lesions respectively of a papular or tubercular type, pea- to bean-sized, flattened, discrete, or closely packed together, usually of a characteristic purplish color. *Erythema urticatum* is characterized by severe itching, and presents in addition to the characteristic lesions of the disease those due to trauma from

FIG. 39



Erythema bullosum. (Howard Morrow.)

scratching. *Erythema vesiculosum* and *erythema bullosum* are exceptional forms, in which exudation is sufficient to produce lesions of this type rather than the edema which occurs in other types. These lesions may be situated at the centre or periphery of an erythematous patch, or occupy the centre of the papule or tubercle. The fluid is usually removed by absorption and is rarely set free by rupture of the vesicle or bulla.

Erythema Iris (*Herpes iris*, *Hydroa vesiculæ*) is the result of the evolution of successive erythematous circular lesions, which at times form several differently shaded concentric rings. The dorsum of the

hand is the usual site of this efflorescence, though the face and mouth may be attacked. At the onset, there appear one or several vesicles or vesico-papules, which pursue their rapid career in two or three days. Upon the hyperemic ring which surrounds these lesions, a second and even a third or fourth circlet of similar lesions form, each pushing the areola further to the periphery of the patch. The older lesions are in full retrogression while the newer vesicles are in process of evolution; and the red blush which surrounds the earlier lesion is undergoing color changes from vivid to purple and paler hues while the zone of the oldest vesicle is assuming its intensest shade. The lesions are pinhead-to pea-sized, rather persistent and firm, and terminate more often by resolution than by rupture and crusting. The concentric and parti-colored rings may make up a single patch an inch or more in diameter, or several such patches may form upon the surface of the integument. In the latter case, the central disk of some of the patches will be seen to be composed of confluent lesions. The subjective sensations are usually mild.

FIG. 40



Erythema multiforme.

The term "multiform" given to this disease by Hebra is justified by the singular diversity of lesions which it displays. The lesions are remarkable not merely for their variety, but also for their occurrence in such variety both simultaneously and successively, and for the rapid change from one type to another. The erythema multiforme symptom complex may accompany such diseases as cholera, typhus, glanders, measles, gonorrhea, septicemia, and malaria. It is also seen comparatively frequently produced by the ingestion of many drugs, chief among which are quinin, arsenic, belladonna, chloral, salicylic acid, and iodine and bromine compounds. It follows also the injection of various serums, particularly the diphtheria antitoxin. A great variety of rashes occur following this, but the erythema multiforme complex occurs fairly often. Finally, there is a group of cases in which the general symptoms are of a marked character. General malaise, fever, inappetence, pharyngeal inflammation, chills, severe gastro-intestinal disorder, rheumatoid involvement of the articulations, and even

organic changes in the heart, lungs, and kidneys, have all been noted as coincident or causative phenomena. In many of these cases it is clear that the exanthem belongs to the list of symptomatic erythemas, and that it is of insignificance in comparison with the grave general condition.

Corlett¹ describes a case of *erythema circinatum bullosum et hemorrhagicum* following a gunshot wound, apparently due to a streptococcic infection, and terminating fatally. The symptom complex in this case was that of multiform erythema. The etiology was a streptococcic infection, and, viewing the case from all standpoints, it appears to have been one of those closely allied to certain forms of pemphigus, particularly the septic variety. Occasionally, *mucous membranes* are affected to a disagreeable or even painful extent. Thus, a sudden tumefaction of the uvula may supervene upon the cutaneous symptoms in cases sufficient to impede respiration; or the lining membrane of the larynx may be involved, and the resulting aphonia in varying degrees persist for two or three days. Hyperemic macules, vesicles, papules, and even blebs, may occur upon the upper and lower lips, inner fasciæ of the cheeks, the gums, the soft and hard palate, and at times the pharynx. These lesions begin as pinpoint- to large-pea-sized, isolated, deeply tinted elevations. In severe cases, painful erosions form. The parts then become tender and swollen, and when hemorrhagic erosions form there may be ulceration of a superficial character.

Etiology.—The affection is commonest in the spring and autumn. It occurs in the young or in the early periods of adult life; the papular and tubercular forms more often in men, the nodose forms in women. Many patients are affected with rheumatism. Mackenzie² has called particular attention to this fact of the relationship of erythema multiforme to rheumatism and to purpura rheumatica. In three valuable contributions to the study of the visceral complications of erythema, Osler³ has shown that the cutaneous symptoms may be merely surface expressions of a visceral disorder. In 29 cases studied by him, there were three sets of symptoms: (a) polymorphous skin lesions, including acute circumscribed edema, urticaria, purpura, and ordinary forms of erythema multiforme; (b) visceral lesions, including (1) gastro-intestinal crises, in which severe colic, with or without vomiting, diarrhea, or bloody stools, was frequent, (2) hematuria and nephritis, (3) hemorrhages from mucous surfaces, (4) cerebral symptoms, (5) pulmonary complications; and (c) infiltration of synovial sheaths and periarticular tissues and arthritis. In some of these cases a given visceral lesion has been accompanied at different times in the same individual by each of the types of cutaneous lesions.

Pathology.—Erythema multiforme is essentially a hyperemia of the integument, that under certain influences advances more or less rapidly to the stage of a mild grade of inflammation, with consequent exuda-

¹ Jour. Cut. Dis., 1908, xxvi, p. 7.

² Brit. Jour. Derm., 1896, viii, p. 116.

³ Amer. Jour. Med. Sci., 1895, n. s., cx., p. 629; Brit. Jour. Derm., 1900, xii, p. 227; and Amer. Jour. Med. Sci., 1904, cxxvii, p. 1.

tion. Crocker, examining a patch of erythema tuberculatum, recognized merely a cell-effusion in the upper part of the corium extending sparsely below, and then chiefly along the ducts and follicles. There was slight rete-proliferation. The chief histological changes, according to Unna, are dilatation of the vessels, perivascular cell-infiltration, and edema of the collagen and elastin; the changes being chiefly noted in the papillary body. Secondary changes in the epidermis consist of edematous swelling of the epithelium, with moderate proliferation and a dilatation of lymph-spaces. In two cases of the moist type, Pardee¹ found simply an acute exudative inflammation of the upper part of the corium. Török² and Kreibich³ also find the condition to be a simple dermatitis and not an angioneurosis.

Diagnosis.—The tendency of the disease to symmetrical arrangement upon the two sides of the body, the recurrence of lesions evidently dating from several periods in which successive crops appear, and the absence of all history of external injury will usually suffice to establish a diagnosis. Important points to be considered are the recognition of the vivid coloring of most of the lesions; their edematous character; their symmetry, as a rule; the pigmentation following those situated on the lower limbs; their frequent association with rheumatism or rheumatoid pains, febrile phenomena, malaise, and other constitutional disturbances. From urticaria, it is distinguished by the type of the lesion; the wheals of the latter are smaller, more whitish centrally, more closely packed together, less symmetrical, rarely grouped, and, as a rule, more acute than those of multiform erythema. Cases difficult to assign to either disease are common, and an error in either direction is not serious. Certain rare forms are difficult to distinguish from dermatitis herpetiformis. Whitfield⁴ reports cases of multiform erythema of the papulo-pustular type which were mistaken for variola. We have seen two similar cases. Finally, certain rare forms are practically indistinguishable from pemphigus.

Treatment.—As in the majority of instances the disease under consideration progresses naturally to a favorable termination within the course of a few weeks, the duty of the physician is usually limited to diagnosis, with a study of the etiology in each case, for the purpose of preventing future attacks. For the relief of the slight burning or itching present in some cases, a dusting-powder, sedative or antipruritic lotion, or protective dressings, such as are recommended for the treatment of acute eczema, may be employed. Bullæ and vesicles should be evacuated and protected with a simple aseptic dressing. Internally, such medication should be employed as is indicated by the general condition of the patient. Iron, quinin, the salicylates, including aspirin, salol, strichnia, and dilute hydrochloric acid, will be found beneficial in many cases. Constipation and indigestion will be corrected by proper measures. A full dose of calomel or blue mass,

¹ Johns Hopkins Hosp. Bull., 1898, ix, p. 165.

² Archiv., 1900, liii, p. 243.

⁴ Brit. Jour. Derm., 1903, xv, p. 273.

³ Ibid., 1901, lviii, p. 125.

followed by a saline laxative, is demanded in many cases to aid in the elimination of intestinal toxins. When the disorder accompanies rheumatic or other systemic disease, internal treatment is to be directed to the general condition present. When the erythema produces extensive edema of the uvula, incisions may be employed to prevent dyspnea and dysphagia. Recently, vaccines have been prepared from organisms obtained in the intestinal canal and employed with possibly some success. Gilchrist reports a favorable result in a case treated with a vaccine made from the *Staphylococcus albus*. This field promises results but requires further work.

Prognosis.—It will be gathered from what has been said that the prognosis is usually favorable, but necessarily varies with the constitutional disease of which the erythema may be a mere symptom. The malady may relapse in susceptible individuals at those periods of the year when it is observed most frequently. Fatal cases, such as the ones quoted by Corlett and others, naturally make the prognosis in certain cases unfavorable.

Erythema Nodosum (*Dermatitis Contusiformis*; Fr., *Erythème noueux*) is regarded by some authors as a distinct affection, and by others is classed as a form of erythema multiforme. Unna sees a distinction between this disease and erythema multiforme in the fact that the lesions of erythema nodosum never widen concentrically, never produce bullæ, and never exhibit annular vesicles, although lesions of both types may occur in one patient. Erythema nodosum rarely if ever recurs, and, while there are many points of resemblance, it will be described here as a separate affection.

Symptoms.—The disease is usually ushered in with some constitutional disturbance, and is commonly associated with joint pains. The lesions occur chiefly on the legs below the knees, on the anterior surface. They are semiglobular, pea- to fist-sized nodules, pale-red, pinkish to livid blue in color, tender on pressure, and exhibit in their involution the variegated hue seen in a contusion. In addition, they may occur, though rarely, on the arms, trunk, and face. Though

FIG. 41



Erythema nodosum. (MacKee.)

occasionally so soft to the touch that fluctuation seems to be present, they do not terminate by suppuration. At times, they appear to develop in crops. They are usually tender on pressure, and often painful. They may disappear in a fortnight, but occasionally remain for several weeks. The petechial appearance of the spots where they have existed is that of the characteristic black-and-blue mark. In rare instances the mucous membranes may be involved.

Etiology.—Like multiform erythema, the disorder occurs most often in the spring or autumn, and most frequently in women, and is very commonly associated with rheumatoid pains. The eruption may occur in tuberculous subjects,¹ and it also occurs often in the poorly nourished and ill-housed. Neara and Goodbridge² recorded a case of erythema nodosum in a patient the subject of acute and fatal tuberculosis. Other causes cited are malarial chills, temperature changes, endocarditis, urethral irritation (blenorrhagic, instrumental), the ingestion of drugs, alcoholic excesses, and dentition. Some stress has recently been laid on syphilis as an etiological factor. Joynt³ reports erythema nodosum following measles in from ten to fourteen days in 9 out of 300 cases. As cases not infrequently develop following a pharyngeal or tonsillar infection, it seems probable that the causative factor responsible for the so-called rheumatic affections starting in this way is identical.

Pathology.—Duhring⁴ regards the disease as in most instances infectious. Mackenzie believes true erythema nodosum to be a manifestation of rheumatism, and in view of the modern conception of the infectious nature of many cases of rheumatism some light is obtained concerning the pathogenesis of the disorder. The histological study shows the ordinary signs of inflammation, including vascular dilatation, small, round-cell infiltration in the papillary and subpapillary layers of the corium, choking of the lymphatics and blood-vessels, and edema. Various micrococci and Demme's bacillus⁵ have been discovered in the blood of patients suffering with erythema nodosum.

Recently Rosenow⁶ has isolated a microorganism from the subcutaneous nodes and blood of 6 patients suffering with erythema nodosum. He describes the organism as a polymorphous, sometimes clubbed, often curved, barred diplobacillus; and by injecting this organism intravenously in animals has produced subcutaneous lesions, exhibited as hemorrhages, followed by infiltration and migration of leukocytes, with enlargement of the regional lymph-glands. From these areas the organism has been repeatedly isolated.

¹ Morfan, *La Presse médicale*, June 26, 1909, p. 457: "Erythema Nodosum and Tuberculosis." Foerster, *Trans. Amer. Med. Assoc., Sec. on Derm.*, 1914, p. 328: "The Association of Erythema Nodosum and Tuberculosis"

² *Amer. Jour. Med. Sci.*, 1912, cxliii, p. 393.

³ *Brit. Med. Jour.*, April 15, 1911.

⁴ *Cutaneous Medicine*, Part II, p. 276.

⁵ *Fortschr. der Med.*, 1888, vi, p. 241.

⁶ "Etiology of Erythema Nodosum: Preliminary Note;" read before the 38th Annual Meeting of the Amer. Derm. Assoc., June, 1914.

Diagnosis.—The characteristic picture presented by erythema nodosum, with the bilateral localization of the lesions, usually presents no difficulty in diagnosis. Syphilitic nodes and gummata are distinguished by the absence of pain; the fewness of the lesions; their overlying integument being untinted save when actually softening and approaching disintegration; their obvious subcutaneous site; their unilateral distribution; and the concomitant symptoms of late lues. Erythema induratum of Bazin is much more chronic, unattended by subjective sensations, and has a tendency to break down and ulcerate. It must also be remembered that potassium iodid and bromid produce lesions resembling this disorder, and in any case contusions and bruises should be ruled out. This latter question, at times, has a bearing in medico-legal questions, especially in the case of young children.

Treatment.—As a rule, rest in bed is essential. This, with a light diet and free elimination, and the administration of sodium salicylate or aspirin, is all that is required. It is well to combine the sodium salicylate with bicarbonate of sodium, giving 0.33 of the former and 0.66 of the latter four times daily. A mercurial purge, followed by a saline cathartic, to begin with, is of value. Locally, the application of heat will relieve the tenderness, and bandaging promotes absorption.

Prognosis.—As a rule, in from two to six weeks the disease has run its course and clears up. Some patients have much temperature and suffer with sufficient pain to cause them great discomfort; but even in these cases the prognosis is good within the above-mentioned time limit.

Erythema Perstans.—Several disorders have been described under the above title. Some of them were probably examples of multiform erythema of unusual duration. Under the title of *Erythema perstans faciei*, Kreibich¹ describes a toxic erythema developing on a lupus erythematosus as a sequel of influenza-pneumonia. This type is described in this work under the title *Erysipelas perstans faciei* (Kaposi). Wende² describes a group of cases under the title *Erythema figurata perstans*. The same author³ reported two cases under the title *Erythema perstans presenting circinate lesions*. These cases are described by Wende as follows: The disease begins with isolated papules, which spread peripherally and fade in the centre, forming circinate lesions. The outer half of the advancing margin is described as being smooth and slightly raised, while its inner edge presents scaling. Some pigmentation follows. The lesions vary in size from that of a silver twenty-five-cent piece to that of the palm of the hand. The configuration also is variable, gyrate forms being common, due to confluence of circinate or annular lesions. Subjective sensations are sometimes noted. Great variation occurs in the length of time required for the development of the lesions. Exacerbations also are variable as to time, the rule being that some lesions remain all of the time. The disease may occur at any age.

¹ Zeitschrift, 1908, Bd. 15, Heft. 8, p. 522.

² Trans. Amer. Med. Assoc., Sec. Cut. Med., 1908, p. 75.

³ Jour. Cut. Dis., 1906, xxiv, p. 241.

Etiology.—While the etiology is unknown, it is suggested that a toxemia originating in the alimentary tract is probably responsible. The microscopic changes described show a superficial inflammatory process, with dilatation of blood-vessels, edema, and perivascular cell-infiltration, consisting of round, plasma, and connective-tissue cells. Secondary changes in the epidermis are shown to be edema and parakeratosis.

Treatment.—Treatment has only been of value temporarily. Chrysarobin and x-rays both have been used, the former with better results. Internally, medication was valueless.

Erythema Infectiosum.—The disease bearing this title appears to be an acute exanthematous disorder somewhat resembling rōtheln. Apparently it was first recognized by Escherich.¹ Other reporters are Heimann² and Shaw.³ The disease is epidemic and occurs in children, commonly between the ages of four and twelve years. The incubation period is from six to fourteen days. The eruption, as a rule, begins on the face, spreading like erysipelas, having sharply defined outlines. There is intense redness and turgescence of the cheeks. On the extremities, bluish-red, erythematous patches occur. In some cases, in these regions the eruption resembles rōtheln. It lasts, as a rule, from six to eight days and then gradually fades, first on the face and later on other areas. It is not followed by desquamation or sequelæ.

Erythème Miliare Leucogénique Prurigineux Chronique.—Milian⁴ under this title described an eruption occurring in a patient who had suffered with urticaria for six years. The present eruption, which was of six weeks' duration, was situated on the trunk, especially about the flanks, also on the thighs and extremities. The lesions were pinhead-sized, slightly elevated, red spots, surrounded by a whitish zone, and were the seat of intense itching. The appearance of the eruption suggested an unusual form of urticaria pigmentosa.

Erythema Elevatum Diutinum.—Under this title, proposed by Campbell Williams and Crocker,⁵ is described a rare disease characterized in most instances by the appearance of pea- to bean-sized, firm, painless nodules, which are pink at first but gradually assume a purplish hue. At first distinct, the nodules tend to coalesce to form irregular-lobed infiltrations; flat, raised plaques or, in exceptional cases, distinct nodular tumors. The lesions have been encountered chiefly on the extensor surfaces of the limbs and joints, but have also been seen on the palms and soles, buttocks, and ears. In most of the cases reported, the lesions persisted for years, though in two cases they gradually underwent involution. The patients have been children or young adults, and usually females. They showed either a personal or family tendency to gout or rheumatism.

¹ Münch. Med. Wochenschr., 1904, xxiv.

² Arch. f. Kinderh., Berlin, 1904, lx, p. 421.

³ Amer. Jour. of the Med. Sci., January, 1905, p. 16.

⁴ Annales, 1906, vii, p. 48; Jour. Cut. Dis., 1907, xxv, p. 128.

⁵ Brit. Jour. Derm., 1894, pp. 1-9 and 33-38.

Stelwagon¹ records four cases of similar nature occurring in adults all past forty years of age, the lesions being situated on the face, nose, and cheeks.

Hartzell² believes erythema elevatum diutinum is simply a clinical variety of granuloma annulare.

Pathology.—Williams and Crocker describe a fibro-cellular process of inflammatory origin, situated deeply in the corium. The sweat-glands apparently were little if at all involved.

Treatment proved unsatisfactory.

GRANULOMA ANNULARE.

Synonyms.—Ringed Eruption (Colcott Fox), Eruption chronique circinée de la Main (Dubreuilh), Lichen Annularis (Galloway), Granuloma Annulare (Crocker), Sarcoid Tumors (Rasch), Neoplasie circinée et nodulaire (Brocq), Erythémato-Sclérose circinée du dos des Mains (Audry), Tumores Benigni Sarcoidei Cutis (Galewski), Stéréophlogose nodulaire and circinée (Pellicier).³

Definition.—A comparatively rare disease characterized by papules or nodules grouped in a ringed or circinate arrangement, pursuing a chronic course, and devoid of subjective symptoms.

The disease has been studied by E. Graham Little⁴ in addition to the above reporters, and much of the description found here is taken from his excellent *résumé*.

Symptoms.—The primary lesion is a deeply seated nodule or a ring of closely grouped nodules of firm consistency, elevated, sharply circumscribed; whitish, pinkish, reddish, purplish or bluish-red in color. The rings are oval or round, and vary in size from half an inch to two or more inches in diameter. The border is elevated from one-sixteenth to one-eighth of an inch, being usually elevated one-sixteenth of an inch. The lesions may be surrounded by a reddish areola, and the centre may be normal, reddened, or even atrophic or cicatricial. The ring may undergo involution irregularly, having crescentic and festooned figures. There may be but a single lesion or a large number, twenty or more having been noted. The lesions may develop suddenly or slowly, and may persist for months or years. There is little tendency to spontaneous involution, although this may at times occur. No sequels are left except in the cicatricial cases. The disease is seen most frequently on the dorsum of the fingers, about the wrists, elbows, neck, feet, ankles, and buttocks. In the three cases studied by ourselves (one histologically), lesions occurred on the fingers, below the knee, and on the ankle. The age of the patients has varied from eighteen months to fifty-two years. Haldin Davis⁵ reports the case of a patient

¹ Dis. of the Skin, 7th Ed., p. 169.

² Trans. Amer. Med. Assoc., Sec. on Derm., 1914, i, p. 27: "Granuloma Annulare."

³ Annales, January, 1910, p. 28; abstr. Brit. Jour. of Derm., 1911, xxiii, p. 32.

⁴ Brit. Jour. of Derm., 1908, xx, pp. 213-248 and 281-317. A critical study of 49 cases, 6 personal. Full bibliography to this date.

⁵ Brit. Jour. of Derm., 1910, xxii, p. 90.

sixteen months of age. The major portion of cases occur in children and young adults.

Etiology.—The cause of the disease is obscure. Crocker found evidence of tuberculosis in some of his cases, and Little¹ found marked tubercular antecedence in several cases, and was inclined to view tuberculosis as an etiological factor.

Pathology.—In Little's collective study, the histology is summarized as follows: In the deeper corium and hypoderm, groups of cells constituting a microscopic nodule were noted about coil-glands, hair-follicles, and blood-vessels. Areas of degeneration were occasionally noted in these cell-masses. In addition, there were rows of cells extending upward along the tracts of coil-ducts and hair-follicles, also some horizontal rows of cells, as well as a scattered cellular infiltration in the corium. The type of cell is given as large mononuclear, spindle, pear-shaped, and oblong connective-tissue cells, and the so-called epithelioid cell. The epidermal changes were insignificant; some thickening of the rete and stratum corneum was noted in certain cases, and in some the normal wavy line between the epidermis and corium was obliterated over a nodule. In the case we studied histologically, the changes were those usually seen in keloid.

Treatment.—Usually simple local treatment is sufficient. Salicylic-acid plaster, ichthyol or resorcin has been found efficient. Jadassohn used arsenic internally.

Prognosis.—Untreated, the lesions persist and tend to spread and last indefinitely, but with simple treatment readily disappear. The disease may recur.

PURPURA ANNULARIS TELANGIECTODES.²

Synonym.—Telangiectasia Follicularis Annulata (Majocchi).

This rare disease was first described by Majocchi in 1896. About thirty cases have been recorded in Italy, France, and Germany. The first case studied in America was recorded by MacKee.³

Definition.—The disease is characterized by telangiectatic, purpuric, and atrophic lesions, usually occurring on the lower extremities. The symptom complex appears sufficiently characteristic to warrant its recognition as an entity.

¹ Loc. cit.

² Majocchi, *Archiv*, 1898, xliii, p. 447 (report of three cases not hitherto described, with histological study); Brandweiner, *Monatshefte*, 1906, xliii, p. 529 (three cases reported, with histological study in one); Rodoei, *Giorn. ital.*, 1911, ii (abstr. *Archiv*, 1911, cx, p. 320); Lipschütz, *Archiv*, 1912, cxii, p. 1017; Brandweiner, *Derm. Wochenschr.*, 1912, lv, p. 1292 (two additional cases reported, with bibliography); Vignolo-Lutati, *Archiv*, 1912, cxiv, p. 303 (case report, with histological study); Lindenheime, *Archiv*, 1913, cxiii, p. 689 (case report, with histological study); Pasini, *Giorn. ital.*, March, 1913 (abstr. *Archiv*, 1913, cxv, p. 1051; a clinical and histological study).

³ "Purpura Annularis Telangiectodes;" paper read before the Amer. Derm. Assoc., at its thirty-eighth annual meeting, May, 1914, Chicago (a clinical and histological study, with a description of the disease as recorded in the literature. To this article the author is much indebted).

Symptoms.—According to MacKee's *résumé* of the recorded cases, the symptoms of the disease may be divided into three fairly well-defined stages, as follows: telangiectatic, purpuric and pigmentary, and atrophic. The early lesions are minute red puncta. These slowly increase in size by peripheral extension, producing lesions from split-pea- to dime-sized and larger. The color may be removed from the early lesions by pressure, but later, in the purpuric stage, the color is permanent. As the lesions spread peripherally, they clear in the centre, producing in some cases slight atrophy. After several months, the lesions disappear, leaving pigmentation. While the eruption is usually situated below the knees, on the anterior and lateral surfaces

FIG. 42



Purpura annularis telangiectodes, showing annular lesions. Some of the margins depict purpuric spots and others show necrosis. (MacKee.)

of the limb, at certain times lesions may be found above the knees, on the arms, and rarely in other situations. In occasional instances, the eruption is preceded by some constitutional disturbance, indicated by neuralgia or rheumatic pains.

According to Majocchi, it should have the following characteristics: (1) rose-colored or livid spots formed from capillary dilatation, followed by hemorrhage, without previous hyperemia or any infiltration of the skin, and usually in distinct connection with the hair-follicle; (2) slow development and increase in size; (3) constant eccentric growth of the spots, resulting in definite ring forms; (4) symmetrical arrangement; (5) the primary location always on the extremities,

usually the lower; (6) the usual absence of subjective symptoms; and (7) commonly leading to slight atrophy and achromia of the skin, together with alopecia. Instead of rings, the lesions may form half-circles, as described by Lipschütz. The course of the disease is slow, but with a tendency to clear up after several months. Brandweiner states that the lesions disappear spontaneously after a few months' duration without scar-formation, and according to this author's observations new lesions not infrequently occur through trauma induced by scratching.

Etiology.—The disease usually attacks young male adults. Majocchi states that the etiology is obscure, but that the disease is probably a vasomotor phenomenon, having some resemblance to erythema pernio. Most authors believe the disease to be either of toxic origin or a neurosis. While usually occurring in adults, it has been seen in children.

Pathology.—Histologically, the capillaries are found to be dilated, and there occurs a perivascular cellular infiltration. In certain cases diapedesis of red-blood corpuscles occurs, and hemorrhagic areas are noted, with deposits of pigment. The lymph-spaces are also dilated, and there appears to be an increase in the number of small capillaries. Phlebitis and obliterating endarteritis are noted. In the final stage, the epidermis becomes atrophic and the papillæ are obliterated. Rodoeli suggested a connection between the disease and tuberculosis. Some cases have given a positive tuberculin reaction, but inoculation experiments have been negative. Most authors agree that there is no connection between the two diseases. MacKee found in an early lesion endarteritis, with increase in the number of small capillaries, edema in the corium, and hyalin degeneration of the arterial walls. In some places aneurysmal sacculation was noted. Hemorrhagic areas also occurred, and in addition a moderate amount of perivascular cellular infiltration, the cells being small lymphocytes. In a chronic lesion the epidermis was atrophic; the corium was edematous and contained a few vessels; there was endarteritis, with partial obliteration of the lumina; and hemorrhagic and pigmented areas occurred throughout the corium, with some perivascular cellular infiltration. The appendages were normal.

Diagnosis.—The disease is to be distinguished from syphilis and from ordinary purpura, but by noting the classical symptoms as described above little difficulty should be experienced.

Treatment.—As the cases tend to clear up of themselves, little treatment is necessary. Rest in bed, with elevation of the limbs, is recommended. In case this cannot be carried out, suitable bandaging would be of value. In rare instances, where necrosis occurs, as in MacKee's case, these areas should be treated with mild antiseptic lotions or ointments.

Prognosis.—As indicated above, the prognosis is good, always remembering the possibility of recurrence.

A PECULIAR PROGRESSIVE PIGMENTARY DISEASE OF THE SKIN.

Synonym.—Schamberg's Disease.

An affection was described under the above title by Schamberg¹ in 1900. A number of similar cases have since been recorded. The disorder progresses slowly and occurs in the form of irregular patches. In Schamberg's first case the patches are described as follows: They are sharply defined, of a reddish-brown color, vary in size, and at the border are visible a number of small outlying macules of the same color and of the size of pins' heads. The borders of other patches are made up of pinpoint- to pinhead-sized, reddish puncta, closely resembling grains of cayenne pepper, though darker in tint. Some present a somewhat telangiectatic appearance. As the lesions undergo involution, a slight, diffuse, brownish-yellow staining is left. There are no subjective sensations.

The disorder began over the shins and spread over the ankles and dorsum of the feet. There were also lesions about the knees and on the flexor aspects of the wrists.

The disease apparently begins as pinhead-sized, reddish puncta or dots, forming irregular patches, which slowly extend by the formation of new lesions upon the periphery. The puncta in time disappear, leaving behind a brownish, brownish-yellow, or reddish-brown pigmentation, which slowly fades (Schamberg).

A *histological* examination reveals a subacute inflammatory process. The most marked changes are noted in the papillary and subpapillary layers, where there occurs a dense cellular infiltration, composed of lymphoid cells and polymorphonuclear leukocytes, with a few epithelioid cells. In addition, there are stellate, fusiform connective-tissue cells and a few mast-cells. Dilated blood-vessels and lymph-spaces are present. Pigment-cells and granules are absent. Infiltration occurs particularly about the sweat-ducts, in some places sufficient to produce obstruction.

The disease is to be differentiated from purpura and angioma serpiginosum.

URTICARIA.

Synonyms.—Hives, Nettle-rash. Fr., Ortie; Ger., Nesselsucht, Nesselausschlag.

Definition.—Urticaria is an acute or chronic disorder of the skin characterized by the presence of wheals, which are, as a rule, spherical and of a white or reddened color, and which induce varying degrees of itching, tingling, and smarting sensations.

Symptoms.—The disorder may be ushered in by constitutional symptoms, such as inappetence, malaise, cephalalgia, or mild pyrexia phenomena, lasting for a few hours or even a day or more.

With or without such prodromic symptoms, the eruption suddenly

¹ Trans. Amer. Derm. Assoc., 1900; and idem, Brit. Jour. Derm., 1901, xiii, p. 1.

appears in the form of wheals, which frequently disappear with equal rapidity, leaving no trace of their existence save a slight and transitory hyperemia of the affected spot. The lesions usually are about the size of a finger-nail or a coffee-bean; but occasionally they may cover a surface equal to that of the palm of the hand or much larger. Flat elevations occasionally occur, which may cover a large part of the trunk and limbs. In color the lesions are rosy-red or whitish, and are usually surrounded by a hyperemic areola. They may be isolated and few, or be numerous and closely packed together; they may even coalesce, so that the individual wheals are scarcely recognizable. They are usually firm or semisolid to the touch. In contour they are roundish or oval-shaped, but a variety of curious

FIG. 43



Dermographism.

outlines may result from the irregularity of their development. Concentric circles, lines, points, bands, and even figures, are in this way produced.

A number of names have been employed to designate the several external peculiarities of the lesions as they are presented to the eye. Thus, *urticaria annularis* occurs in rings; *urticaria figurata* in gyrations, from the union of several lesions or patches of lesions; *urticaria vesiculosa* and *urticaria bullosa*, where there is a vesicular or bullous development at the summit of the lesion; *urticaria papulosa* (described in this text under the title *lichen urticatus*); *urticaria tuberosa*, where "giant" wheals occur, some attaining the size of a hen's egg; *urticaria hemorrhagica* (*purpura urticata*), where the urticarial element is developed

in a lesion produced by cutaneous hemorrhage (Beck¹ recorded a case in which hemorrhagic lesions followed a tonsillectomy in a patient suffering with ordinary urticaria); *urticaria evanida* and *urticaria persans*, where there is, respectively, a rapid or a slow process of involution in the characteristic symptoms; and *urticaria solitaria*, where there is a single recurring lesion.²

Urticaria Factitia is a term employed to denote a form where the irritability of the skin is of such a degree that wheals may be induced by local irritation. The finger-nail drawn across the unaffected portions of the skin will produce a linear wheal ("urticarial autogram") of extent corresponding with the line of irritation (*dermographism*). The lesions thus produced may be transitory or last for some time. Occasionally, this condition exists in patients not the subject of the ordinary wheals.

The subjective sensations in urticaria are distressing in varying degrees according to the susceptibility of the individual. Every grade of itching, burning, tickling, crawling, pricking, and especially stinging, sensations is thus engendered. The efforts of the patient to secure relief by scratching not only serve further to develop the eruptions, but also to irritate, tear, and otherwise wound the lesions already in full evolution. In this way lesions ordinarily transitory in their course may be changed to more persistent, deeply colored, flat, lenticular papules. Where the skin is delicate and thin, as is that of the lids and prepuce, considerable edema may result.

All parts of the body may become affected. The mucous membranes of the mouth, pharynx, and larynx may occasionally become involved.

The rapidity of the appearance and disappearance of the lesions visible upon the skin is a characteristic feature of the disorder. In some instances, only a few moments are required after the operation of an efficient cause to develop a large number of closely packed wheals. Even while they are under inspection, it can be noted that there is a change in individual lesions, some fading or completely disappearing while others are newly developing.

The course of the disease varies, being, as a rule, acute, the recurring lesions tending to disappear within a few days. In other cases the disease may become chronic and last for years by the constant development of new lesions. In many cases apparently trivial the disease may become so aggravated that its relief taxes the skill of the physician to a high degree.

Urticaria, like erythema, may be either idiopathic or symptomatic; and in each form the urticarial conditions may underlie or be superimposed upon almost every elementary lesion noted in the integument. The wheal may complicate, or may be complicated by, the macule, papule, tubercle, vesicle, bulla, or pustule. It is common in trauma-

¹ Monatshefte, 1908, lxvii, p. 393; abstr. Jour. Cut. Dis., 1909, xxvii, p. 44.

² Vornier, Zeitschrift, 1913, xx, p. 1; abstr. Jour. Cut. Dis., 1913, xxxi, p. 796 (report of a case of urticaria characterized by one lesion recurring in the same locality, thus resembling herpes).

tisms, and is a prominent symptom in the skin bitten by insects, reptiles, or domestic animals. Baker¹ reported a case of *urticaria tuberosa* characterized by the presence in various parts of the body of persistent, yellowish-red tubercles, that proceeded to ulceration. The parts most affected were the knuckles, the elbows, and the ears. These tubercles were said to have begun in the manner which characterizes the onset of evanescent urticarial wheals and tubercles. A somewhat similar case was observed by McCall Anderson.²

Under the title *urticaria tuberosa verrucosa*, a number of cases of anomalous urticaria have been recorded (Cf. chapter on Prurigo Nodularis).

In occasional instances, the urticarial lesions may be followed by pigmentation, which bears a slight resemblance to the lesions of *urticaria pigmentosa*. These cases are usually chronic. Other cases, termed *urticaria recidiva*, occur in which new lesions of the usual type are constantly appearing during a period of from several months to many years. Several chronic types of urticaria have been described under such titles as *urticaria perstans* (*tuberosis cutis pruriginosa*)³ and *acne urtica*,⁴ varieties of urticaria in which pigmentations, nodules, and verrucous- and lichen-planus-like lesions dominate the clinical picture.

Urticaria in Infants and Children (*Lichen Urticatus*).—Under this title Colcott Fox⁵ described what he considered *the* urticaria of childhood. It differed in many respects from that seen in the adult, and he and many others state that the usual urticarial wheals seen in the adult cases are not common in childhood. At a later period the same author⁶ describes this disorder under the title *lichen urticatus*, a disorder originally described by Bateman. /

The distinguishing features of this variety of urticaria are the following: It is persistent, lasting for many years, having exacerbations, periods of quiescence, and relapses. It is usually worse in the summer season, and is characterized chiefly by papules. These are the predominant lesions seen when the patient is examined, and are found on any part of the body, but are most numerous on the trunk. They are prurigo-like, pale or reddish in color, and irregularly disseminated. They are preceded at night, according to Fox's observation, by the occurrence of a wheal or wheal-like area, which excites the greatest distress in the infant during that time. In the centre of this area the papule forms. Occasionally, in places papules, vesicles, vesico-pustules or pustules occur. In certain cases, on the hands, large vesicles and bullæ appear, strongly resembling scabies. In addition, at times, secondary infections are present, together with all the symptoms of a marked traumatic dermatitis.

¹ Lancet, August, 1881, i, p. 153.

² Brit. Med. Jour., 1883, i, p. 1103.

³ Archiv, lxxi, p. 208.

⁴ Ikonographia Dermatologica, Fasc. i, Tab. ii.

⁵ Brit. Jour. Derm., 1890, ii, pp. 133 and 176.

⁶ Allbutt and Rolleston's System of Medicine, vol. ix, p. 238.

These cases are to be differentiated chiefly from scabies and prurigo. After careful observation through a period of several years, Fox concludes that lichen urticatus and prurigo are different disorders.

Etiology.—Idiopathic urticaria results from the action of external irritants, prominent among which are the bites or stings of mosquitoes, lice, fleas, bed-bugs, gnats, wasps, bees, and caterpillars. The wounds inflicted by the jelly-fish give rise to a stinging or burning sensation, which induces the patient to rub or scratch the part. A wheal is rapidly formed at the site of the injury, and the irritation set up is conveyed to other parts of the skin in the vicinity; so that a single traumatism may excite an urticaria covering a much larger area. This is true of the bites of the various insects above mentioned. Many vegetable substances have an irritant action upon the skin. The nettle (*Urtica urens* and *U. dioica*) exhibits this characteristic to a high degree and has given the malady its name. A large number of other agencies operating externally may produce an urticaria in individuals predisposed to the disease or having a peculiar intolerance for a particular substance. Climatic influences, more particularly those in which the surface of the body is exposed to cold air, are efficient in the production of urticaria, as also of bronchial asthma, with the symptoms of which the disease under consideration, in the case of adults, may often coexist or alternate. Mechanical violence, the application of leeches to the skin, and surgical traumatisms may also act as exciting causes.

Symptomatic urticaria is chiefly of the variety named by authors *ab ingestis*, since it most frequently results from medicinal or dietary articles taken into the stomach.

Among the medicinal articles capable of producing urticaria may be named the balsams, the turpentine, quinin, glycerin, chloral, valerian, arsenic, hyoscyamus, cinchonidin, salicylic acid and the salicylates, senna, santonin, opium and its alkaloids, and the various vaccines, including the antitoxins, the last-named producing both ordinary urticaria and urticarial erythema in a large number of patients thus treated, and in some cases of a severe grade.

Among the dietary articles capable of producing urticaria may be named eggs, cheese, pork, sausage, coffee, tea, cocoa, confectionery, lobsters, clams, caviar and several species of fish-roe and fish generally, grapes and their skins, nuts, dates, raisins, figs, prunes, strawberries, gooseberries, raspberries; canned (tinned) fruits, meats and vegetables; oatmeal, cucumbers, peas, beans, onions, garlic, corn, mushrooms, pickles, sauces, honey, pastry, salads, and spinach. Vinegar, champagne, beer, and alcoholic beverages in general are capable of producing a similar effect.

In children and infants a severe urticarial efflorescence may be invoked reflexly by worms, or by any undigested food, or indigestible material of any sort that may have passed into the stomach. In adults, also, who have experienced repeated attacks of urticaria, and suffer from sensitiveness of the gastro-intestinal tract, any food

history of well-nigh intolerable distress at night or at other odd times, and who repeatedly and vainly endeavors to exhibit the lesions as they appear upon the skin. Being examined on various occasions, scarcely a trace of cutaneous disorder is manifest. Here the practitioner has actually to decide upon the character of an eruption he never sees. The task is rarely difficult, no other than the urticarial eruption beginning in this fashion. Occasionally, delicate rosy or deeper stained mottlings of the skin-surface remain where the wheals have been. At times, also, on the flexor aspect of the forearm, or in some situation in which the skin is equally delicate, one or more typical lesions may be produced by the aid of a finger-nail in scratching, or by rubbing. These cases are frequently of the chronic, or at least of the relapsing, class, and the victims of the disease may have a characteristic facies, a worn look from loss of sleep or from emotional disturbance.

The several lesions of erythema are larger than those of urticaria, and they do not develop from characteristic wheals; in erythema multiforme the lesions are far more persistent in type and do not provoke the characteristic subjective sensations of urticaria; in erysipelas the redness is characteristic and the swelling more diffuse.

Treatment.—Naturally, the first indication to be observed is the removal of the cause, and with this, if possible, accomplished, the next is the exclusion of all aggravating agencies. The discovery of the cause, at times readily effected, is often the most serious problem presented. An exhaustive and minute examination of the person and the history of the patient, a study of his food, drink, medicine, *régime*, clothing, sleeping apartment, habits, occupations of life, and mental state, are here essential. When the disorder is recent, and is an *urticaria ab ingestis*, a brisk emetic or a cathartic may rid the stomach or the bowels of offending matters. As a rule, a light diet should be outlined for the following several days. In many cases the alkalies are of value, and often the preparations of sodium, potassium, or magnesium are employed. Laxatives, such as rhubarb, magnesia, the cathartic mineral waters, and, in case of children, small doses of castor-oil, are frequently indicated, even when there is no suspicion of irritating ingesta. At other times there is marked atony of the digestive organs, and in such cases the mineral acids, the bitters, and the ferruginous tonics may be needed. In case an indigestion is present, it should be treated according to the type discovered.

Other remedies found useful in the internal treatment of urticaria are sulphurous acid in 1 drachm (4.) doses three times daily in sweetened water (Da Costa); copaiba; sodium nitrite (J. P. Sawyer); strychnin (Guibout); sodium arsenate, employed by Blondeau in doses of from $\frac{1}{30}$ (0.002) to $\frac{1}{50}$ (0.0013) of a grain; the fluid extract of ergot in $\frac{1}{2}$ drachm (2.) doses (Morrow); atropin sulphate in doses of $\frac{1}{60}$ (0.001) of a grain (Schwimmer); and sodium salicylate in 20 grain (1.33) doses. The latter drug has been praised highly by a number of writers. It is frequently given in 1 grain (0.06) doses every hour. Quinin is of value even in cases which are not malarial. Aspirin in

5 grain doses (0.33), given from three to five times daily, is also of distinct value. Pilocarpin, or the fluid extract of jaborandi, is known to produce at times a powerful effect in relieving surface congestions of the skin by means of the sweating it occasions.

Schwimmer endorses the following formula for this affection:

R—Atropinæ sulph.,	gr. $\frac{1}{2}$;	0 01
Aq. dest.,		
Glycerin.,	āā 3ss;	2
Gum. tragacanth.,	q. s.	M.
Ft. pil. No. xx.		

When urticaria is due to such disorders as malaria, gout, or diabetes, the relief of the urticaria depends upon the eradication of the original disease. An appropriate treatment should be instituted with that end in view.

In the local treatment of urticaria, protection of the sensitive skin from all sources of irritation is the chief object. The complete covering of the affected region with absorbent cotton will often cause a rapid disappearance of the symptoms. Individual lesions which are sealed with collodion or plaster usually disappear promptly. The zinc-oxid adhesive plaster is very serviceable, as it does not irritate the skin as a rule. The patient's underclothing should be of soft linen, cotton, or silk, and to prevent friction with the skin a dusting-powder may be used freely, both on the skin and in the meshes of the underwear. Sleep should be secured without an excess of bed-covering, and places where the temperature is for any reason elevated should be carefully avoided by the patient, such as proximity to a fireplace or a drop-light, heated places of amusement, or the kitchen.

Great diversity exists in the methods employed to assuage the disagreeable sensations experienced in the skin. As a rule, some antipruritic application is necessary, the following apparently giving best results: phenol, in the strength of $\frac{1}{4}$ to $\frac{1}{2}$ of 1 per cent., in a lotion; dilute hydrocyanic acid in the strength of $\frac{1}{2}$ to 1 per cent.; menthol in the strength of $\frac{1}{2}$ to 1 per cent., in an ointment; camphor, in the strength of from 10 to 15 per cent., in a dusting-powder.

The diversity of method is explained by the varying results obtained in different patients after the application of the same medicinal agent. Thus: cold and hot water-baths; baths medicated by marine salt; aromatic vinegar, alcohol, cologne, camphor, the alkalies, and sulphuric ether (compresses dipped in such solutions and laid over the part affected); douches, and vapor-baths will, any of them, in the case of some individuals, produce a marked alleviation of symptoms, and in others will be either inoperative or actually serve to aggravate the symptoms to the highest degree. Hebra asserts that several of the baths named above are useless, while Kaposi recommends cold lotions medicated with aromatic volatile substances. Fox prefers that alcohol, or cologne-water to which benzoic acid has been added, be dabbed over the part and permitted to evaporate. Solutions of menthol in

alcohol and water, 1 part to 500 or 600, operate similarly. Hillairet and Gaucher employ in a similar way a solution consisting of one-third of ether and two-thirds of warm water.

The alkaline bath should contain sodium carbonate, sodium biborate, alum, or potassium bicarbonate, either singly or in combination, in the strength of about 6 ounces (180.) of the salt to 30 gallons of water; 1 or 2 ounces (30.-60.) of potassium sulphuret may be substituted. The water is made demulcent by the addition of starch or of gelatin, or by immersing in it a muslin bag containing bran. When it is desired to employ the acid bath, $\frac{1}{2}$ ounce (15.) of either hydrochloric or nitric acid is added to the quantity of water given above. The bath of this size may also be medicated with 1 drachm (4.) of corrosive sublimate; or this drug may be used as a lotion in the strength of from $\frac{1}{4}$ (0.016) to $\frac{1}{2}$ (0.033) grain to the pint (500.). Phenol, benzoic, salicylic, boric, dilute hydrocyanic, and dilute nitric acids in weak solution are also employed with advantage in some cases.

Other external applications are thymol, ammonium carbonate, potassium bromid, ether, chloroform, or chloral-camphor in the strength of $\frac{1}{2}$ to 1 drachm (2.-4.) to the ounce (30.) of ointment. This latter substance is prepared by rubbing together equal parts of camphor and chloral until a semiliquid results. The preparation is an antipruritic remedy of value, but if not largely diluted will increase the uneasy sensations produced. In other cases an oily or fatty substance will give more prompt relief, especially if the eruption has been irritated by scratching and tends to persist. Among useful applications may be named the linimentum calcis of the pharmacopœia and cold-cream salve, to which may be added fluid extract of grindelia robusta, 1 part to 20 or 30 of vehicle; also the dusting-powders, which are described in the chapter relating to General Therapeutics. Among these Anderson's dusting-powder is valuable:

R—Pulv. camph.,	5jss;	6
Pulv. zinci oxidi,	3ss;	15
Pulv. amyli,	3j;	30

These powders are the most cleanly of all external applications in urticaria, and are often the only local measures required. Among the Germans, sulphur, naphthol, and tar-salves are employed in the management of the disease.

One of the most effective and trustworthy of local applications in severe urticaria is a starch solution. The starch is first mixed with cold water, and is then boiled until the solution is of the consistency of thin mucilage. To each pint of this 1 drachm (4.) of zinc-oxid and 2 drachms (8.) of glycerin are added before ebullition is completed. When cool and applied to the surface this solution often gives prompt relief. The same is true of a thin solution of boiled oatmeal.

Frequently a change of residence and climate, with a variation in the routine of life and new social surroundings, is of value. The various mineral springs, both in America and abroad, have been visited to

advantage, largely for the reasons mentioned above. Thus, the Karlsbad, Vichy, Saratoga, and White Sulphur Springs have all been credited with the production of beneficial effects in urticaria.

In lichen urticatus particular care must be exercised in outlining a diet suitable for the child. The elimination is important, and all sources of possible irritation must be sought out and eliminated. In severe cases an anodyne is necessary at night, and Fox advises opium or chloral. Internally, rhubarb and bicarbonate of sodium are of service. Locally, in addition to any of the above-mentioned topical applications, Fox recommends:

R—Hydrarg. chlor. cor.,	grs. jss;	075
Chloroformi,	℥ xx;	1 20
Glycerini,	℥ ij;	60
Aq. rosæ,	q. s. ad. ℥ viij;	240

Prognosis.—The prognosis in an attack of urticaria, as may be seen from what has preceded, is exceedingly variable in different cases. Simple attacks of the acute sort are trivial, and in a few days the patient may retain but the slightest traces of his trouble. In the case of children, the attack is often at an end in the course of twenty-four hours.

It should, however, never be forgotten that urticaria may torment the life of a patient to the utmost bounds of tolerance and seriously impair the general health. Persistent and rebellious chronic urticaria may prove to be a truly formidable affection.

Urticaria Pigmentosa¹ (*Xanthelasmaidea*).—Urticaria pigmentosa is among the rare diseases, although a large number of cases are now recorded. It has been noted in all large centres of population, and unquestionably a great many cases have been seen and more or less studied without being reported. The disorder was first described by Nettleship, in 1869, and its present name was given by Sangster, in 1878. Blumer, in 1902, compiled 83 cases, and in 1905 Little collected additional ones, making a total of 154, and many more have appeared since.

Symptoms.—The disease, as a rule, begins in the first year of life, though many true examples have occurred at a later date. According to Little's statistics, 70 per cent. appeared before the end of the first year. The early lesions may be urticarial, occasionally bullous, or of the type which is characteristic of the disease, which is exhibited as a pigmented macule or nodule. The disorder is described as occur-

¹ For bibliography incorporating practically all the recorded cases, see Blumer (Monatshefte, 1902, xxxiv, p. 213, with a review of the clinical and pathological features of the disease); Reiss (ibid., 1903, xxxvii, p. 93); Dühring's Cutaneous Medicine, vol. ii, p. 300; Wolff (Mraček's Handbuch, i, p. 599); Perrin (La Pratique derm., iv, p. 772); E. Graham Little (Brit. Jour. Derm., 1905, xvii, pp. 355, 393 and 427; and ibid., 1906, xviii, p. 18. A thorough exposition of the subject, with a report of 14 cases, with histology and a review of the recorded English, German, Austrian and French cases, a total of 154); Knowles (Trans. of the Amer. Derm. Assoc., 1914. A report of four cases and a special study of the histology, with bibliography); Thin, Hoggan, and Fox (quoted by Unna, p. 955).

ring in three types: first, those exhibiting plane or macular lesions; second, those which are distinctly nodular or tubercular; and, third, mixed varieties. Of 121 cases collected by Little in which the type was indicated in the description, 83 were of the macular, 10 of the nodular, and 28 of the mixed type. The lesions vary in color through all the shades of brown, yellowish-brown and reddish-brown. When irritated they become reddened and temporarily lose some of the brownish shade. Occasionally, in the nodular variety, a zone of redness

FIG. 44



Urticaria pigmentosa with xanthoma-like lesions.

surrounds the brownish discoloration. The lesions vary in size, and, according to Little, are from split-pea- to coin-sized and larger, and as a rule are uniform in size in a given patient, the macular variety presenting larger lesions. In shape they are oval or circular. While, as a rule, the lesions remain discrete, they may coalesce and form large patches, more commonly in the macular variety, when by fusion irregular figures are formed, and in certain cases large areas of the cutaneous surface become involved. While there is no special distribution

of the lesions, the trunk, especially over the back, may be most extensively involved. Occasionally, they spread to and involve the neck, face, scalp, palms and soles, and the buccal mucous membrane and palate. On the mucous membrane of the mouth Little describes small, brownish-yellow, slightly raised patches, which were devoid of subjective sensation. As these were not examined histologically, he was not certain that they were true lesions of the disorder. The lesions vary in number from a few to a great many. Little describes a case with but two lesions, and Colcott Fox¹ one with less than a dozen macules. Another case of widespread dissemination is described in which the greater portion of the cutaneous surface was involved. The lesions usually develop rapidly and then remain for long periods of time, the pigment in most cases being permanent. Fresh outbreaks occur at irregular intervals. One case is recorded of fifty years' duration. As a rule, no sequels other than the pigment are left, but in a moderate number of cases scars have been noted. The surface of the macules is smooth, while that of the nodules may be corrugated and roughened. An important clinical manifestation is the reddening, swelling, and enlargement of the pigmented lesion when irritated. This phenomenon does not occur in any other of the pigmented disorders. The subjective sensations may be marked, moderate, or absent. In a number of cases itching is not a prominent feature. In consequence of this, the general health is but little affected in most cases. As a rule, dermographism is present, even in cases not subject to itching. General enlargement of the glands was noted in a number of cases, even in those in which itching was absent. The glands are described as being hard and shotty, and resembling those found in syphilis. In one of the author's patients the lesions closely resembled those of xanthoma, and the diagnosis was only made after a histological examination.

Etiology.—The cause of the disorder is unknown. It occurs more frequently in fair than in dark people. The male sex shows a greater number of cases. Several incidents have occurred which have been attributed as factors in the production of the disease, but these may have been coincidences. The disorder has been seen to follow vaccination, varicella, and measles. Rarely a shock to the nervous system has apparently been a factor. Hutchinson was of the opinion that insect-bites were responsible. In one case, the eruption appeared after a sulphur-bath. In another, the administration of morphin injections to the mother during pregnancy was believed to be the exciting cause. Neisser believed the disease to be allied to the nevi. Little states that it seems to be a justifiable inference that there is a general tendency, probably congenital, to over-production of mast-cells in the skin of patients suffering with urticaria pigmentosa. The local excessive accumulation, clinically represented by macules or nodules, may be determined, as the clinical experience would indicate,

¹ Allbutt and Rolleston's System of Medicine, 1911, ix, p. 236.

by various accidental phenomena: vaccination, varicella, urticarial lesions, and even an emotional stimulation, such as fright, acting upon a skin already fundamentally abnormal. He further states that, inasmuch as uniform blood-changes were found in his cases, the disease is probably a congenital blood-disorder of the same class as hemophilia, pernicious anemia, and lymphadenoma.

Knowles believes it is due to a toxin of unknown nature acting upon a congenitally abnormal skin, and that the disease should be dissociated from urticaria.

Pathology.—The histological changes found in this disorder are characteristic. They were described early by Hoggan, Fox, and others, but the character of the cells was not recognized until the classical description given by Unna in 1887. At that time, discovery was made that the cellular infiltration was composed of mast-cells, and it is the presence of these in large numbers that produces the characteristic histological picture. According to Unna's early description, these cells are found in the corium, distending the papillary body and flattening the epidermis above. They are closely packed, mast-cell to mast-cell, and arranged in columns by the persistence of collagenous tissues, between which, when spastic edema is added, wide lymph-spaces open. In his early work Unna believed these to be migrated wandering-cells, but later decided that they developed locally from connective-tissue cells which had taken up mast-cell granules. In the epidermis, aside from more or less stretching and flattening, no other changes were noted, except an increased amount of pigment in the basal layer of the rete. Unna's findings have since been confirmed by practically all observers, early among whom should be mentioned Baumer,¹ Gilchrist,² and Brongersma.³ More recently Little,⁴ Knowles, and others have made a particular study of the histopathology of the disease.

In addition to the rows and columns of mast-cells found between the collagenous bundles, cells are also found about the blood-vessels, hair-follicles, and sweat-glands, and granules from these cells may be occasionally detected lying free in the lymphatic spaces of the corium and subcutaneous tissue. The cells are cubical and fusiform in shape, but aside from their special arrangement present no peculiarities. The collagen-bundles are separated and spaced out, especially in the superficial part of the corium, and the elastin shows a similar arrangement. Little states that the pigment is found in special cells in the basal layer of the epidermis, and that these extend upward and invade several superimposed layers of the rete. The same cells may be seen free in the corium, usually near the basal layer of the epidermis. The amount of pigment is variable, and, according to Little, the color of the lesion depends upon the number of mast-cells as well as the amount of pigment. Gilchrist and Little found mast-cells in apparently normal skin in these cases. The blood-vessels of the corium appear to be

¹ Archiv, 1896, xxxiv, p. 323.

² Johns Hopkins Hosp. Bull., 1896, vii, p. 140.

³ Brit. Jour. Derm., 1899, xi, p. 179.

⁴ Loc. cit.

increased in number and are dilated, and it is about these structures that the major portion of the cellular infiltration occurs. Edema is described by a number of observers throughout the whole cutis, with dilatation of the lymph-spaces about the vessels and glandular structures. Little also found an intracellular and occasionally an intercellular edema in the epidermis. Unna believed the brown color of the lesion was due to the ordinary pigment of the epidermis, which was increased in the basal layer of the rete; but according to Little's observations the pigment occurs in special cells situated not only in the basal layer but above it, and also a few in the corium, and he repeatedly demonstrated the granules of pigment to be melanin.

Diagnosis.—Urticaria pigmentosa is to be distinguished from the slight pigmentation left after well-marked urticaria of later years by the beginning of the disease in infancy and by the persistence of the nodules. Xanthoma in all its forms is readily distinguished by its occurrence in special regions (the eyelids, for example); by its first appearance, in most patients, at a later period of life than infancy; and by its characteristic chamois-leather-yellow shade.

Treatment.—Treatment is entirely unsatisfactory. When an urticarial tendency is present, this may be treated in accordance with the rules laid down for that disorder.

Prognosis.—The active reproduction of lesions commonly subsides spontaneously after a certain number of years. The hyperpigmentation may remain indefinitely. Certain cases have been reported as having been relieved in a short time, but in the major number the disease persists after long periods of time.

Angioneurotic Edema.¹—**Synonyms:** Giant Urticaria (Milton), Urticaria Edematosa (Hardy), Acute Essential Edema (Etienne and Galliard), Wandering Edema, Quincke's Edema, Acute Circumscribed Edema.

This unusual disorder was early described by Milton,² Bannister,³ Quincke,⁴ and many others. The disease is characterized by circumscribed edematous swellings of the skin and subcutaneous tissues. It appears suddenly, lasts from a few hours to a day or two, and is accompanied by sensations of tension and by varying degrees of itching. It occurs, as a rule, about the face, genitals, and extremities, and has a marked tendency to recurrence, often showing an hereditary history and continuing its activities through years to a lifetime.

Symptoms.—The lesions appear suddenly, often in the early hours of the morning, and may be single or multiple, and of great variation in size, consistence, color, and shape, depending upon their situation. In size they vary from one to two inches in diameter on the hands and eyelids; while on the trunk and lower limbs large-nut- to orange-sized

¹ For literature, Cf. Index Catalogue of the Surgeon-General's Library, 2d Series, vol. xii; and Cassirer's monograph: *Die vasomotor-trophischen neurasem*, Berlin, 1901; also Osler's *Modern Medicine*, 1909, vi, p. 648; Bullock, *The Treasury of Human Inheritance*, Part iii, 1909.

² *Edinburgh Med. Jour.*, 1878.

³ *Chicago Med. Review*, June 20, 1880.

⁴ *Monatshefte*, 1882, p. 129.

globular tumors are seen. Osler describes swellings on the hands as large as light-weight boxing-gloves, and saucer- to plate-sized swellings on the trunk and thighs. On the eyelid and lip the author has seen, in common with many others, swellings of such size as entirely to distort the features of the patient. In color the lesions may be of the normal hue of the surrounding skin, opaque-white, translucent, or waxy-looking, or of a slightly yellowish tinge; or they may be reddened in varying degrees. The local temperature may be normal or subnormal. In consistency the lesions are firm, elastic, and at times hard. On the eyelids the lesions are softer, and pitting may be detected; in the declining stages in other situations the lesions become softer, and after their disappearance the skin may be flabby and wrinkled. The overlying skin is smooth and shining, and in certain cases bullæ may form (Osler). As a rule, the lesions occur asymmetrically, though a symmetrical arrangement may be noted on the hands, and occasionally the whole face may be involved. The areas of predilection are the face, genital region, and extremities, though the trunk and other situations may be attacked: the mucous membranes of the mouth, pharynx, larynx, the accessory sinuses and other portions of the upper air passages, the gastro-intestinal mucosa, and the conjunctiva. Edema of the glottis produces alarming symptoms and numerous fatalities are recorded from this involvement. A remarkable example of this is portrayed by Osler (p. 655).

The progress of the disease is marked by recurrence of lesions, frequently in the same situations, through a period of years. In a patient under observation for some years the lesions constantly recurred on the tongue, upper lip, eyelid, and dorsum of the hand. The swelling remained for several hours to one day and was intense.

Subjective symptoms are usually noted only in the feeling of tension, with moderate itching or sensation of heat. As a rule, there are no constitutional symptoms, though concomitant attacks of colic have not infrequently been noted. In ten of Osler's cases colic was present, and he cites examples in which abdominal operations have been performed for erroneously suspected appendicitis, gall-stone, or renal colic.¹ In addition, there may be various grades of indisposition (head-ache, dizziness, and depression) as accompaniments. In other cases there have been noted hemoglobinuria, albuminuria, and various cutaneous eruptions belonging to the urticarias, erythemas, and purpuras.

Etiology.—The affection occurs most frequently in early adult life, and is rare after the sixtieth year. Fox² records an example occurring at the age of three months. All writers agree that the disease occurs most frequently in people of the private-patient class. Relative to sex, the disease occurred in 14 females and 4 males in Osler's list of 18 private cases; while, on the other hand, Collins (quoted by Fox) found in a collection of American cases one-third more females, and

¹ Amer. Jour. of the Med. Sci., 1904, cxxvii, p. 751.

² Allbutt and Rolleston's System, 1911, ix, p. 228.

Cassirer,¹ in his review of the literature, found the condition reversed, namely, 70 males to 63 females.

Among predisposing causes various factors are recorded, such as nervous influences, which Osler believes most important, and which are exhibited as migraine, neuralgia, exophthalmic goitre, and melancholic tendencies. Other factors are malaria, alcoholism, menstrual disturbances, emotional disturbances (fright, anxiety, worry), overwork, insomnia, and mental exhaustion. Morichau-Beauchant² divides the acute circumscribed edemas into three groups: the arthritic, the peliotic, and the true angioneurotic edema, and believes they have a common cause in gastro-intestinal toxic infection. Schlesinger³ observed the disease associated with erythromelalgia, both disorders being induced by over-indulgence in alcohol. Heredity is an important factor. Osler⁴ recorded its occurrence in 22 people in five generations, in which it caused two deaths. Ensor⁵ recorded 49 cases in seven generations, 12 of whom died of edema of the glottis. Other much less remarkable hereditary examples have been noted.

Pathology.—The pathogenesis of the disorder is unknown. Its close relationship to urticaria is admitted. The local lesion, according to Osler, is an extreme urticarial one, with exudation of serum, leukocytes, and occasionally red-blood corpuscles. Its relation to the purpuras and erythemas is suggestive.⁶

Diagnosis.—In well-defined cases, with recurring large, tense lesions occupying the classical regions, the diagnosis is clear. Localized edemas from well-known causes must be differentiated, such as those occurring in local thrombosis, stasis, infections about the nose inducing lymphatic obstruction, and the early edematous stage of scleroderma. The lesions of angioneurotic edema are more acute and transient, and by a consideration of the accompanying features of other disorders are differentiated. The difficulty has occurred particularly in those cases involving the gastro-intestinal mucosa, accompanied by colic. The symptoms here are erroneously attributed to other disorders.

Treatment.—The treatment, in the main, resolves itself into the general care of the patient. Careful general systematic examination must be made, and all departures from the normal corrected if possible. Winfield⁷ recorded a case of angioneurotic edema entirely relieved following successful treatment of cholelithiasis; and Oberndorf⁸ reported disappearance of the symptoms of angioneurotic edema following an appendectomy. In some cases changes in the dietary have been beneficial, in others useless. Stimulating, highly seasoned, and indigestible foods, and spirits are to be interdicted.

¹ Loc. cit. ² *Annales*, 1906, vii, p. 22; abstr. *Jour. Cut. Dis.*, 1907, xxv, p. 130.

³ *Med. klin.*, Berlin, 1906, ii, p. 94; abstr. *Jour. Cut. Dis.*, 1907, xxv, p. 129.

⁴ *Amer. Jour. Med. Sci.*, 1888, xcv, p. 362.

⁵ *Guy's Hosp. Reports*, 1904, lviii, p. 111.

⁶ Osler, *Brit. Jour. Derm.*, 1900, xii, p. 227.

⁷ *Jour. Cut. Dis.*, 1907, xxv, p. 217.

⁸ *Jour. Amer. Med. Assoc.*, 1912, lix, p. 623.

Strychnin, quinin, and arsenic, as well as the bromids, ergot, belladonna, the salicylates, and aspirin, are of value. In Osler's experience the nitrites and nitro-glycerin, given in large doses, and calcium salts were of the most value.

Prognosis.—The milder cases run a benign course and recover in a reasonable time. Others are persistent and troublesome for years; while in severe mucous-membrane involvement edema of the glottis is always a menace. In 170 cases tabulated by Bullock, death occurred from this cause in 36.

PRURIGO.¹

Synonyms.—Prurigo of Hebra, Prurigo Gravis, Prurigo Ferox, Prurigo Agria, Prurigo Mitis.

Definition.—Prurigo is a chronic, exudative, cutaneous affection, commonly beginning in infancy or early childhood, continuing through life, and characterized, at first, by urticarial symptoms, and later by the occurrence on the extensor surfaces of the extremities, and also on the trunk, of minute, pale or reddish papules, accompanied by an intolerable itching. The disease formerly was chiefly seen in Austria, but of late years has been described in many parts of the world, including America. In this country, as a rule, only mild cases are seen among the native population.

Prurigo is one of those terms which in the past have led to considerable confusion in the nomenclature of cutaneous disease, the term having been applied to many different affections. It is here limited to the disorder originally described by Hebra under that name, the characteristics of which are outlined below.

Symptoms.—The earliest symptoms are usually displayed, in the latter portion of the first year of life, in the form of an urticarial rash, which persists, and which is finally succeeded by typical papules of the disease. Fox² maintains that the initial eruption may be papular and not urticarial. These papules are millet-seed- to hemp-seed-sized, in color not differing markedly from that of the normal skin. They are intensely pruritic, and rapidly become covered with blood-stained crusts in consequence of the induced scratching. As a result of this trauma, there ensues a long train of complications, including pustulation, fissures, excoriations, dense infiltrations, crust-formation from exuded serum and dried blood, edema, lichenification, and diffuse, dark-brown pigmentation of the skin-surface in large areas. The glands which receive the lymphatic flow from the excoriated areas are enlarged. This adenopathy is conspicuously shown in the inguinal and cubital glands. Fully developed, the disease presents in general the same physiognomy in patients of different ages. The extremities

¹ Sir Malcolm Morris: Prurigo, Pruriginous Eczema, and Lichenification. Brit. Med. Jour., June 29, 1912, p. 1469; with discussion (Brit. Jour. Derm., 1912, xxiv, p. 251) by Colecott Fox, Galloway, Leslie Roberts, Whitfield, E. Graham Little, and MacLeod.

² Allbutt and Rolleston's System, ix, p. 271.

always exhibit the severest manifestations of the disease, and of these the leg and forearm are usually affected more severely than the thigh and arm; though the trunk, the forehead, the neck, the face, and the scalp may also be involved. Hebra found the disease exhibited with increasing severity from the scalp downward. The extensor surfaces are invariably selected by the disease, while the flexor surfaces, such as the axillæ and the groins, except as regards adenopathy, are free from change. The general health of the patient manifestly suffers from insomnia and nervous agitation induced by the state of the integument. Emaciation, malnutrition, and cachexia are common sequels. The mental and moral tone of the patient thus harassed from early childhood throughout an entire life is necessarily profoundly impaired. Insanity and suicide are reckoned among its remote consequences.

Mild and severe forms of the disease are distinguished under the terms *prurigo mitis* and *prurigo ferox* or *agria*; they agree with respect to the evolution of symptoms; the only difference to be observed is in their intensity. In the former the papules are fewer, the recrudescence rarer, the itching less intense, and the amenability to treatment more pronounced. Although incessant and judicious treatment, favorable climatic influences, and comfortable conditions of life are factors which mitigate the symptoms, nevertheless the difference between the two forms is probably largely determined by the intensity of the causal elements which first establish the disease in the individual. A prurigo which begins with severe symptoms may persist in the *ferox* form throughout life; while a prurigo *mitis* is such from the first appearance of the disorder. A prurigo-like eruption not infrequently occurs in association with lymphadenoma.

Etiology.—The disease occurs chiefly in Austria, a few cases being recorded elsewhere. Wigglesworth,¹ Campbell,² Zeisler,³ and others have reported cases in America. The actual cause of prurigo is not positively known. It is encountered more often in the male sex, is never contagious, and is never induced by lice; but, according to Hebra and Kaposi, it may be grafted upon an hereditary predisposition. Several cases have been known to appear in one family, suggesting strongly an hereditary element. "Scrofula," tuberculosis, malnutrition, "misery," poverty, anemia, and filth are held to be severally favorable to its development. Boas,⁴ after a series of tuberculin injections in twelve patients, concludes that tuberculosis is not a factor in the prurigo of Hebra. The disease is practically limited to the poorer classes living under wretched hygienic and social conditions. Some authorities, especially among the French, hold that the disease has a neurotic base; that the itching is the essential element, the papules developing from the irritation of scratching. Others believe that a toxic cause operates, because of the urticaria at the beginning and the frequency of stomach and bowel disturbances in those who are afflicted.

¹ Amer. Jour. Syph. and Derm., 1873, iv, p. 21.

² Archiv. Derm., 1878, iv, p. 119.

³ Jour. Cut. Dis., 1889, vii, p. 408.

⁴ Nord. med. Archiv, Abt. ii, p. 24; abstr. Brit. Jour. Derm., 1912, xxiv, p. 374.

It is highly probable that both theories have a more or less true relation to the etiology of the disease.¹

While typical prurigo ferox, as described by the Vienna school of authors, is rare in America, the opinion is gaining ground that the same disease with milder manifestations (prurigo mitis) is much more common here than has been believed. Imported cases from Vienna, presenting severe grades of the disorder, were seen by Dr. Hyde in his clinic. Cases of the milder type are a matter of not uncommon record.

Pathology.—Kaposi practically admits that, striking as is the clinical portrait of this disease, its anatomical features are indistinguishable from severe forms of obstinate papular eczema, or from other forms of chronic dermatitis accompanied by hyperplasia. The microscope reveals proliferation and swelling of rete-cells, cell-infiltration, and edema of the papillæ, most marked around the vessels, and frequently dilated lymph-spaces. There is a scattered deposit of pigment in the corium, and many cutaneous muscles (erectores pilorum) are thickened and shortened. Holder² states that these muscles are not only hypertrophied, but also are contracted, and that the papule has an urticarial basis.

Some authors contend that the papules are solely due to traumatism of the pruritic skin. Auspitz believes that the disease is in fact a sensori-motor neurosis without an essential lesion. Riehl³ considers it as a chronic form of urticaria. Leloir and others find the prurigo-papule invariably resulting from a cystic degeneration of rete-cells, thus forming a cavity, which at first contains clear serum, with the addition later of epithelial débris. The walls of the cyst later undergo keratinization.

Bernhardt,⁴ after studying a typical case in a patient with a paralyzed arm, believes the disease is a dystrophy of the corium due to chronic irritation of the trophic centres, and that the papule precedes the itching.

White,⁵ in a review of the subject which sets forth the great diversity of opinion as to the nature and cause of prurigo, concludes: "I cannot go farther than accept the existence of a condition of early childhood, allied to pruritus and urticaria in its visible manifestations, and not to be distinguished positively from them in its first stages, often becoming in certain parts of the world a chronic affection due to some inexplicable national cutaneous traits, or inherent customs of living; a condition which certainly lacks many of the essential elements of individuality."

Diagnosis.—Remembering the extreme rarity of prurigo in America, it is to be distinguished chiefly from the various forms of papular eczema by the location of its lesions, by the course of the disease, by the age of the patient when it is first developed, by the great extent of

¹ Matzenauer, Mraček's Handbuch, Bd. ii, pp. 701-714 (with bibliography).

² Jour. Cut. Dis., 1901, xix, p. 489.

³ Vierteljahr, 1884, xl, p. 41.

⁴ Archiv, 1901, lvii, p. 175 (bibliography).

⁵ Jour. Cut. Dis., 1897, xv, p. 2.

the fingers and the toes, the flexor aspects of the extremities, and the face are more or less spared. Under treatment eczema commonly yields, at least in some portions of the skin, while prurigo does not.

From pruritus, prurigo is readily differentiated by its general physiognomy and history, by its peculiar pigmentations and infiltrations, and by the special regions chiefly affected. Eczema may occur coincidentally with prurigo, as a result of the scratching induced by the intense itching present in the latter disorder. In pediculosis corporis the parasites usually will be found upon the underclothing, and the lesions induced by the finger-nails never form closely-packed papules. There is something highly characteristic in the widely separated excoriations, the puncta from wounds inflicted by parasites, and the inflamed papules seen upon louse-bitten patients.

In scabies the characteristic burrows of the parasite will usually be recognized, as also vesicular and pustular lesions. Urticaria can be mistaken for prurigo only in the earlier stages of the last-named disease. From lichen urticatus a period of observation may be necessary to make the differentiation.

Treatment.—In Vienna, sulphur, naphtol, tar, green soap, baths, and frequent anointings with oily and fatty substances have occasionally served to ameliorate the severe symptoms of the disease. Mercury, ichthyol, salicylic acid, phenol, boric acid, and diachylon and zinc ointments may also be employed upon different portions of the skin when indicated.

The Wilkinson salve, representing a combination of tar, sulphur and green soap, has proved of special value in many cases. Vlemingckx's solution (*q. v.*), followed by hot bathing, and corrosive-sublimate baths, 1 drachm (4.) of the sublimate to 30 gallons of water, has also been recommended. Fox¹ reports a case relieved with sulphur and ichthyol ointments. Internally arsenic has proved valueless, while phenol occasionally has seemed beneficial. Cod-liver oil and the ferruginous tonics with the bitters are indicated in many patients suffering from malnutrition. A generous diet and a tonic regimen are often essential to the management of the disease. It is to be noted of all cases that they are influenced happily by the warm weather of the summer season and by special attention to cleanliness and hygiene.

Prognosis.—The disease usually persists through life. The most favorable conditions are those in which the patient is young and surrounded by circumstances which permit of provision for his needs.

Prurigo Nodularis.—**Synonyms:** Multiple Tumors of the Skin Accompanied by Intense Pruritus; Urticaria Perstans Verrucosa.

Definition.—In the year 1880, Hardaway,² of St. Louis, described this rare disease, which occurred in a female patient under his care, the histological study being made by Heitzmann. In 1906, Schamberg and the eruption, and by the uniform type of its lesions. In prurigo, also,

¹ Jour. Cut. Dis., 1903, xxi, pp. 148-229.

² New York Jour. Derm., April, 1880; Trans. Amer. Derm. Assoc., 1879, p. 78.

Hirschler¹ described two cases of a similar character occurring in negroes. In 1908, a similar case was seen by Dr. Hyde, and the above title applied to this group. Zeisler,² in 1912, made a clinical and histological report of a similar case, and brought together several other cases described in the literature under other titles, the chief of these being *Urticaria perstans verrucosa*. He included also White's case of *Lichen obtusus corneus*.³ In the case presented before the New York Dermatological Society in 1909 by Dr. Jackson⁴ as "Multiple tumors associated with itching," Dr. Johnston stated that the general appearance, behavior, and histological character justified its assignment to the prurigo group.

Symptoms.—The disease appears to occur chiefly in adults, and usually in women. The lesions are nodular and verrucous in type, firm, pea- to finger-nail-sized, occurring in great numbers on the back, but chiefly over the extremities, hands, arms, feet, legs, and thighs. The smaller are at first covered with a smooth envelope, whitish, pinkish or brownish (blackish on the negro skin) in color. As they grow older they become rough, acquire a horny consistency, and often develop at the summit a verrucous condition. After scratching, which is practised in all cases, the surface of the nodule becomes furrowed, fissured, and at times hemorrhagic. In some instances the nodules become fused in a plaque of infiltration; in others they are isolated throughout. In one case they began as "blisters;" in all the others as dry papules. Itching in all cases is severe and appears to be limited to the lesions, and seems to be an essential feature of the disease.

The course of the disease is exceedingly slow, lasting from fifteen to twenty or more years. In some cases not a single lesion has disappeared after its development, and in others recurrence has happened after extirpation. That the nodules are not due to trauma from scratching was demonstrated in several cases.

Etiology and Pathology.—The nature of this rare disorder is obscure. The description of the histological changes in all the cases corresponds closely; the chief changes noted being hypertrophy of the epidermal layers, particularly the stratum corneum; vascular dilatation, perivascular cell-infiltration of the corium, with proliferation of the fixed connective-tissue elements. Mast-cells were described in excess in the case of Schamberg and Hirschler. Johnston⁵ stated that in his case Dr. Welch, of Johns Hopkins, discovered that the infiltration lay particularly about the nerve-trunks, which fact would account for the intense itching accompanying the lesions. Johnston further found at times a superficial intraepidermic vesicle, similar to that found in prurigo.

Treatment.—No treatment as yet practised has been effective. In Zeisler's case temporary benefit was obtained by the combined use of x-rays and a 10 per cent. chrysarobin varnish.

Prognosis.—The prognosis is unfavorable as regards the comfort of the patient and the complete removal of the lesions.

¹ Jour. Cut. Dis., 1906, xxiv, p. 151.

² Ibid., 1912, xxx, p. 654.

³ Ibid., 1907, xxv, p. 385. ⁴ Ibid., 1909, xxvii, p. 39. ⁵ Ibid., 1912, xxx, p. 659.

ECZEMA.¹

Synonyms.—Ger. Eczem.; Fr., Eczéma.

Definition.—Eczema is an acute, subacute, or chronic inflammation of the skin, beginning as an erythema, or by the appearance of isolated or grouped papules, vesicles, or pustules, occurring in uniform, multiform, or modified types upon a reddened, generally infiltrated base; accompanied by more or less intense itching and burning sensations; resulting in catarrhal symptoms and crusting, in infiltration and scaling; and leaving, after complete resolution, no cicatrices.

Eczema is distinctly a protean disease. It is difficult, therefore, to define or describe it satisfactorily in a single paragraph. It is not only protean in its clinical manifestations, but its causes are varied, numerous, and usually complex. In histological detail different types of eczema vary considerably, yet all probably result from one common pathological process. Clinically, though a dozen successive cases of eczema may present wholly different pictures, yet they all have some characteristics in common, and the diagnosis in most cases is not difficult. It has often been described as a catarrhal inflammation of the skin, but while it is true that as a rule eczema shows at some time in its history more or less serous discharge, either in vesication or in a denuded, oozing surface, many cases of the erythematous or papular type persist as such throughout their entire course, and never produce an exudate upon the surface. From a clinical standpoint eczema cannot, therefore, be regarded as invariably a catarrhal disease.

A vexed and unsettled question among dermatologists is the relation of eczema to other forms of dermatitis. The study of the exact pathological changes in the skin has led to the inclusion under eczema of conditions formerly considered distinct affections. On the other hand, many writers, especially in England and France, are now endeavoring to exclude from eczema every dermatitis for which a definite cause can be found. Eczema is a dermatitis, and it is not possible to say for every case which title is the more appropriate. A convenient arbitrary division, which is followed in these pages, classes under dermatitis those forms of inflammation of the skin which result from recognized external causes, and which subside on the removal of the cause. Such definite and independent affections as dermatitis herpetiformis or dermatitis repens are, of course, considered separately.

Symptoms.—Eczema is characterized by heat, redness, itching or burning sensations, infiltration of the skin, weeping or moisture at some stage, and multiform lesions. The surface involved in typical eczema always shows some elevation of temperature, slight in chronic, but in acute cases possibly exceeding 105.5° F. (41° C.). Redness, varving in shade from the bright red of the acute to the dull red of the

¹ For a complete presentation of the subject, with full bibliography, the reader is referred to the chapters on Eczema, by Besnier, in *La Pratique Dermatologique*, t. ii, pp. 1 to 305, and by Unna, in *Mraček's Handbuch*, Bd. ii, pp. 169 to 393; also *Dühring's Cutaneous Medicine*, Pt. ii, pp. 311 to 420.

chronic forms, is a feature of the eczematous skin. Itching is practically always present and may vary from a slight annoyance to an intolerable distress. It is commonly intermittent or paroxysmal in character and is usually worse at night. In some instances, especially in acute and erythematous types, the sensation of burning or smarting may be more marked than that of itching. Occasionally, an eczematous skin is hyperesthetic and exceedingly sensitive to contact with even the blandest substances. The degree and character of the subjective sensations in eczema depend largely upon the location, type, or severity of the disease, but also to some extent upon the general condition or peculiarities of the individual. In acute types of eczema there is often some edematous swelling, together with slight infiltration of the skin. In chronic forms the infiltration and thickening of the skin are more pronounced and may be excessive.

The serous discharge which is present during at least a part of the course of most eczemas is characteristic, and stiffens articles of clothing on which it dries. It may be imprisoned in vesicles, but more commonly oozes from a denuded surface or from minute excoriated points which represent abortive or ruptured vesicles.

Aside from some cases of erythematous and papular eczema, which may persist throughout without change of type, eczema is notably a polymorphic disease, presenting in irregular succession, or in varied combinations, erythema, papules, vesicles, pustules, crusts, scales, fissures, excoriations, or denuded and oozing surfaces.

In addition to the symptoms of heat, redness, itching, or burning, and swelling or thickening of the skin, found in every case of eczema, the great majority of eczemas have certain characteristics in common. The course of the disease is capricious; not only does the severity of the process change frequently and rapidly, but often the type of lesion as well. This is most conspicuous in children and in others having delicate skins, and in those cases in which the affected areas are not protected from atmospheric and other external influences it is unusual for eczema to pursue an even course. Daily variations in severity, with or without change or modification of type, are not uncommon. Apparent recovery is frequently followed by a relapse, which may develop fully in a few hours and without apparent cause.

Like other inflammations, eczema may be acute or chronic. The acute may precede, and the chronic may follow, or the reverse may occur. The disorder originating in subacute or insidious forms may become chronic, and then, as the result of fresh or of more severe irritation, may develop the most acute symptoms. Frequently, as in the eczema of children, the disease may be chronic in respect to duration, yet most of the time present acute symptoms. As a rule, eczema does not undergo spontaneous recovery, but tends rather to remain indefinitely and to extend either by involving contiguous surfaces or by developing in new areas. The disease is commonly more or less local, appearing in one or several irregular and usually ill-defined areas, but it may be general or even universal. It apparently occurs inde-

pendently of all other disorders, the general health remaining unaffected even in severe forms of the disease; or it may be the external expression of constitutional disturbance.

Clinically, several types of eczema can be recognized. These types require separate description. It should not be forgotten, however, that in the majority of cases eczema is a complex process, in which two or more types are seen, either in succession or simultaneously. Though several forms of eczema frequently coexist, it is usual for one type to predominate, either throughout the course of the disease or for certain periods.

Eczema Erythematosum is most common on the face, especially in individuals exposed to wind and weather or to direct heat, but it may appear on any part of the body, and is frequently seen on the palms, the soles, and in the genital regions. It begins usually as a diffuse, ill-defined area of redness; less frequently as a number of coin-sized macules or erythematous spots, which may coalesce or remain more or less distinct. Swelling and infiltration are present in varying degrees. In acute cases the edema may be excessive, sometimes closing the eyes. In the subacute forms, which are the more common, there is less edema and more infiltration and thickening of the skin.

The sensation of itching, which is so characteristic of most forms of eczema, is usually excessive, though it may be largely or wholly supplanted by one of heat or of burning. This is especially true when the process is acute in character. The color varies from a bright- to a dull- or purplish-red, depending upon the severity of the disease, its location, and the peculiarities of the individual; and inasmuch as the condition is more frequently observed in middle-aged adults, with darker hue of integument than in early life, the color of the part is often noticed to be of a dull-crimson shade. At times the coloration is irregularly distributed, producing a mottled appearance, bright at one point and dark at another. A yellowish tinge usually indicates that the process is combined with seborrhea, producing the combination described in another chapter as *dermatitis seborrheica*.

The erythematous surface is modified, as a rule, by more or less fine desquamation, which begins a few days after the occurrence of the first erythema, and persists to the end of the disease. There is no discharge, unless, as frequently happens, the type changes to a moist form. When the disease occurs on apposed surfaces, as in the axilla, under the breasts, on the interdigital surface of the feet, or about the genitals, the superficial epidermis may be destroyed by maceration and friction and leave a denuded, oozing surface (*eczema intertrigo*).

The disease may pursue an acute course, terminating in exfoliation and gradual resolution, or changing to the papular, vesicular, pustular, or mixed types. More frequently, the process persists and becomes chronic. The skin then becomes more infiltrated and thickened, and may present voluminous firm folds, which are very conspicuous and often deforming. Exfoliation may be a pronounced feature. The area involved is frequently better defined than in other forms of eczema,

and though the condition may remain limited to its original site for months or years, it has a decided tendency to extend either contiguously or by the formation of new areas. The intensity of the process may change frequently and rapidly. It is usually aggravated by exposure to heat, cold, or wind, or by any condition which favors congestion of the part. Scratching of the surface involved produces a change in the symptoms, which the skilled eye will promptly recognize. Minute superficial losses of tissue are then visible here and there upon the surface; the more recent lesions having a reddened floor, possibly hidden beneath a thin blood-scale, the older being surmounted by a light, yellowish-red crust. The scratch-lines, often recognized elsewhere, are here less evident.

FIG. 45



Eczema nuchæ (Lichenification).

Like all other varieties of eczema, this form is extremely liable to recrudescence and relapse. In advanced life traces of the disease may be visible for years.

Eczema Papulosum.—Under this title are classed all those forms which have been described as *Lichen Simplex*, *Lichen Eczematodes*, and *Eczema Lichenoides*. In exceptional cases eczema may exist from first to last as a dry infiltration of the integument. There is perhaps no one of the various manifestations of the disease that is so frequently confounded with other widely different affections.

The papules are acuminate, pinhead-sized or larger, colored in various shades of red to a dark lurid shade, and are usually seated upon a reddened and infiltrated base. They are generally discrete, though often set closely together; are accompanied by an intense form of itching; and of all eczematous lesions are most likely to be irritated by scratching. Their summits are torn, often to such an extent as to bleed, the blood drying in minute crusts on the apices of individual lesions. Existing papules may persist for weeks or may disappear and be replaced by others. They may coalesce completely to form irregular, thickened, elevated, pea-sized or larger patches, covered with scales. The areas involved in papular eczema are often fairly well defined in outline. The extent of surface affected varies, the disease being in some cases largely diffused over several portions of the body, but it is usually limited to small single patches no larger than the size of a small coin. Such patches, covered with a single or with several groups of reddish papules, may continue to torment the patient for long periods of time, or, being at one time relieved, may recur with each aggravation of the malady by the exciting cause. Papular eczema is a dry manifestation of the disease, and is thus most frequently noticed upon the drier portions of the integument. If the moist forms of eczema are most frequently seen in early life, it is none the less true that the dry forms are the most common in adult life or in advanced years.

The papules here described, when there is free exudation beneath the surface, may exhibit pinpoint-sized, vesicular summits, which may develop into minute or larger pustules. A patch of papular eczema, where no vesiculation or pustulation has been observed, will, if sufficiently scratched, ooze with moisture, allowing the serum to escape from the abraded surface. There are, in fact, few scratched eczematous surfaces which will not moisten a handkerchief applied to the part. This weeping condition attracts the attention of patients themselves. A species of relief from itching is thus obtained; and in aggravated cases patients will scratch or rub or otherwise irritate the diseased patches, not merely for the purpose of gratifying the intense desire to assuage the itching, but also to induce serous exudation for the sake of the relief it affords.

Resolution of papular eczema is accomplished after the formation of scales, the tissues beneath the latter assuming more and more the appearance of healthy skin.

Eczema Vesiculosum.—This type is characterized at an early period by the formation of minute vesicles. It is a matter of importance, however, to recognize the fact that the vesicular, like the erythematous, is but one of several manifestations of this singularly protean affection.

The clinical features of vesicular eczema are chiefly due to the acuity of the inflammatory process present, and to the consequent free exudation of the serum of the blood from the dilated vessels of the corium. The involved surface usually feels at the outset hot, itchy, or unusually sensitive; and soon after becomes more or less intensely reddened, the

result of hyperemia and subsequent exudation, which may last for one or for several hours. Poppy-seed- to grape-seed-sized vesicles then become visible on this reddened base. The lesions may be closely packed together, or be discrete, or may be so abundant as to coalesce, a frequent behavior of all vesicular lesions. Each vesicle is filled with a droplet of clear serum imprisoned beneath the most superficial layers of the epidermis. This vesicle is readily ruptured, and if this rupture does not speedily occur as the result of accident, the lesion bursts spontaneously, and its limpid contents are then poured out upon the surface of the integument. The quantity of the fluid thus exuded is in excess of that originally contained in the small vesicular chambers, due to the fact that the excoriated, macerated, and broken epidermis no longer presents an obstacle to the outflow of serum from the engorged vessels beneath. Minute and even large drops of a clear fluid of syrupy consistency can be seen collecting at the points where the solution of continuity has occurred. If with a slip of bibulous paper the first drop be removed, its place is visibly filled by a second. Crops of new vesicles succeed the first, each drop being followed by the train of symptoms described. The vesicles are usually short-lived and often have disappeared before the patient is seen by the physician. In other instances the destruction of the epidermis by rubbing or scratching, or by an abundant and rapidly formed exudate, allows the escape of the fluid without previous vesicle-formation. The discharge dries rapidly, when exposed to the air, in light-yellowish crusts, which are rarely bulky.

The contour of the affected patch or patches is seldom well defined, the pathological portions imperceptibly shading into the sound skin. The color of the area thus diseased varies according to the stage of the process, being at one time a vivid red, at another yellowish, and when covered with crusts or scales undergoing a corresponding change of hue. Infiltration of the skin occurs rapidly, so that when a portion of the affected integument is pinched up between the finger and thumb it is found to be thicker and less elastic than normal. This form of eczema may persist or recur in a single small area, or it may spread and become diffused or even generalized. It appears commonly on the flexor and other surfaces where the skin is thin.

The subjective symptoms of vesicular forms of eczema are more or less intense itching and often burning. In very acute forms there is considerable soreness, the patient managing the affected part with as much care as if it were a fractured limb. In exceptional cases, more frequently observed in children, there is a sympathetic febrile disturbance of a mild grade.

As resolution approaches, all the symptoms described above gradually decline in severity; the serous discharge diminishes, the redness fades, the limits of the involved area become less distinct, the crusts loosen and fall, and beneath the scales which have taken the place of the oozing and broken epidermis a new and tender epithelial covering is produced. As a rule, for weeks after the process has completely ceased

the newly formed epidermis has a slightly reddened and tender appearance, though complete resolution is followed by no permanent sequels.

FIG. 46

*Eczema pustulosum* (infantile).

FIG. 47

*Eczema impetiginosum*. (Fox.)

Instead of undergoing resolution, the condition may terminate in eczema rubrum, in eczema squamosum, or in eczema pustulosum, this last form being ordinarily due to pus-infection.

Eczema Pustulosum (*Eczema Impetiginoides; Impetigo Eczematodes*).

—This type may originate in one of the other forms of eczema, in consequence of the severity or acuity of the process, or be the result of secondary pus-infection; or pustular lesions may rapidly form at the onset. Usually, there is first seen a crop of minute vesicles, which enlarge and become distended with puriform contents. These pustules either accidentally or spontaneously burst, and the fluid with which they are distended dries into yellowish-green or darker colored friable crusts. In aggravated cases the purulent matter seems to form directly

FIG. 48



Eczema pustulosum. (Fox.)

upon the involved surface. If the process be long continued, infiltration occurs, and the itching, which in all varieties of the disorder is a characteristic feature, is awakened as an accompanying symptom. The itching, however, is rarely of the peculiarly aggravated type accompanying the erythematous and papular phases. Pustular eczema is most frequently encountered on the head and face, also at times on the limbs, particularly about the hair-follicles. It attacks those who are debilitated or whose resistance is lessened to the invasion of pus-cocci. When existing on the face or scalp, there is most commonly an involvement also of the sebaceous glands, the secretion of which, altered by the periglandular inflammation, is added to that naturally produced by the exudative process. Singular shades of

mixed yellow and green and even black are then to be distinguished in the resulting crusts, which later desiccate and fall, leaving a reddened and tender new epidermis beneath.

A particular type attacking the hair-follicles was first described by Morris, under the title *Eczema Folliculorum*. In this form each inflamed follicle projects from the surface in the form of a reddened papule, about which the skin becomes hyperemic. As the process spreads centrifugally by the involvement of adjacent follicles, the centre undergoes involution, with desquamation and a gradual change in color from red to yellow. This condition is found most frequently on the extensor surfaces of the legs and arms, in multiple, scattered patches. The condition is obstinate, usually recurrent, and may be accompanied by intense itching. Morris considers it parasitic in origin and allied to sycosis.

Many examples of pustular eczema belong to a group differentiated by Engman¹ and emphasized by Fordyce,² designated as *Dermatitis Infectiosa Eczematoides* (cf. this chapter).

The four types of eczema considered above are, as has been stated, sometimes encountered in practice as distinct and unmingled forms of cutaneous disease, some of them more commonly than others. To present, however, a picture of eczema as it is seen clinically, it must be understood that these several forms, useful in the analytical study of the disease, often become, in actual observation, well-nigh inextricably commingled. "Observation of the natural course of an attack of eczema," said Hebra, "furnishes the most unassailable proof of the connection between its various forms. In one case an eruption of vesicles begins the series of symptoms; in another it is preceded by the appearance of red, scaly patches or groups of papules; or vesicles and papules are developed together, some of the former rapidly changing to pustules and forming yellow, gum-like crusts by the drying up of their contents." It is this constant interchange of features that distinguishes most eczemas from all other inflammatory affections of the skin.

Eczema Rubrum.—This name has been given to the red and angry form of the disease, which, because of the free exudation of serum from the surface, has also been termed *Eczema Madidans*. In this form the highly inflamed, intensely red, and wounded integument, the horny layer of which has been destroyed and removed, pours out freely upon the surface a thick, gummy or syrupy fluid, which, if artificially removed, leaves behind it a swollen, angry, and still discharging skin; or, being permitted to dry where it has formed, covers the surface with large, flake-like crusts, which may be thin and yellow, or thick, dark-colored, and often blood-stained. The crusts may remain but a few hours before an excessive outpouring of the fluid removes them. There are thus displayed in frequent and rapid alteration the discharging and the crusted surface. Eczema rubrum may occur on any part of the

¹ Amer. Med., 1902-03, iv, p. 760.

² Jour. Cut. Dis., 1911, xxix, p. 129.

body, but especially in the flexures of joints or where two surfaces are apposed; another common site is the legs of elderly people or of those who stand much of the time. In this region the disorder is exceedingly chronic and rebellious to treatment, and eventually is accompanied by a great degree of infiltration and thickening, which may go on to hyperplasia and produce a condition simulating elephantiasis.

Eczema Squamosum (*Eczema Exfoliativum*).—This type is marked by more or less redness, infiltration, and exfoliation of the skin. The scales are usually small, thin, whitish, and adherent. They may be scanty or quite abundant. Squamous eczema represents a low grade of inflammation, and is present as a transitory condition during a part of the period of resolution of all other types of the affection. It frequently persists, however, in the form of irregular, usually ill-defined, more or less infiltrated, dry, scaly patches. It is seen commonly on the neck and face, at the border of the scalp, and on the limbs.

Eczema Fissum (*Eczema Rhagadiforme*).—In eczema of the hand the movements of the fingers often produce fissures or cracks in the inflamed and infiltrated integument, and to those fissured forms the titles named above have been given. Fissures are observed wherever an eczematous disorder has so impaired the elasticity and extensibility of the skin that its necessary movements, especially about the joints, tear and stretch the thickened integument. It is thus seen not only on the hands, but also on the arms, the feet, and about the ankles, the resulting rhagades being, at times, the most painful of all the complications of the malady. It is seen frequently about the mouth and anus. Occurring upon the bodies and the hands of those who are compelled to come in contact with irritating substances, this form of the disease finds its severest expression. Mild commingled forms of squamous and fissured eczema occur quite commonly on the hands and faces of persons whose skin is thin, tender, and poorly nourished, or exposed to wind, hard soaps, hard water, chemicals, and other irritants. The condition is popularly known as *chaps* or *chapping*.

Eczéma Craquelé.—This is a rare form of eczema described by French writers in which a reddened surface is covered with large, thin flakes, or scales, separated and outlined in polygonal areas by superficial cracks or fissures. The condition usually involves a considerable surface of the skin, and is accompanied by itching and burning, and in most cases by hyperesthesia and an extreme sensitiveness to temperature-changes. It occurs chiefly in neurotic subjects.

Eczema Verrucosum.—Eczema verrucosum, or the wart-like form of the malady, is occasionally observed, especially upon the lower extremities, in middle life or in advanced years, as the result of long-continued disease. The integument becomes thickened and so hypertrophied as to suggest the appearance of warts closely packed together in a circumscribed patch.

Eczema Sclerosum.—This form is most frequently observed upon the palmar and plantar surfaces, and the lower limbs about the ankles. In eczema sclerosum is presented a densely thickened, inelastic integu-

ment, suggesting the condition of tanned leather, without the occurrence of any of the other lesions of eczema described above. As a consequence, perfect extension of the digits is impaired.

Eczema Nummularis (Devergie).—Eczema nummularis is a localized patchy variety, occurring chiefly on the surface of the limbs, particularly the upper, but also on the trunk, and is characterized by small, poorly-defined, erythematous and vesicular patches of rapid development, and by itching and exudation. Under the title *Recurrent Eczematoid Affection of the Hands*, Pollitzer¹ describes a similar condition limited to the dorsum of the hands, and rarely occurring on the extensor surface of the forearms. In these round, sharply-defined groups, closely aggregated vesicles occur, of an average size of 2 to 3 cm. in diameter. The patch rises suddenly, does not increase in size peripherally, is accompanied by moderately severe paroxysmal itching, and disappears in a few weeks under appropriate treatment. Relapses are common.

Tuberculous Eczema of Nurslings, so called, is a term which has been applied to eczematoid eruptions about the mucous orifices of the eyes, nose, mouth, and ears, occasioned and sustained by morbid conditions of, and serous discharges from, those parts (otorrhea, rhinitis, phlyctenular keratitis), and accompanied by edema, vesiculation, and enlargement of lymphatic glands. The disease is characterized by rebelliousness to treatment and chronicity of course. This disorder is improperly named, since tubercle-bacilli have not been recognized in its lesions; and because the symptoms above enumerated may all be present when there is simply systemic nutritive failure, with no tuberculosis of other organs present.

Eczema Diabeticorum (*Fr.*, *Diabétides*).—A singularly well-defined eczema is to be recognized about the genital organs of those suffering from persistent or even transitory glycosuria, due to the irritation produced by the passage over the parts of urine charged with sugar. Women are often thus affected; and the condition is accompanied by the most atrocious itching, excoriations produced by scratching, and enormous tumefaction of the ano-genital and surrounding integument. The local symptoms are chiefly those of eczema erythematosum, the surface being, as a rule, destitute of either vesicles or pustules. There are often a profuse serous discharge, considerable infiltration, and the production of inflammatory nodules over the engorged surface.

Eczema Parasiticum.—Under this title is included a large number of cases the exact relations of which to the recognized types of the disease are still indeterminate. It is well known, for example, that the surface of the human body in health is the habitat of an enormous number of different parasites, which are, for the most part, harmless or are effective as agents of disease only under certain specially favorable conditions of the body. Cultivation-experiments with the flora found on the eczematous skin have revealed a large number of parasites

¹ Jour. Cut. Dis., 1912, xxx, p. 716.

which together, if not singly, may be effective in producing some of its distinctive features.

A ringworm fungus (*Epidermophyton inguinale*) is responsible for the so-called eczema marginatum (described in the chapter devoted to Ringworm), also for many cases of eczema intertrigo of the toes. In

FIG. 49



Infectious eczematoid dermatitis, following ecthyma. (Fordyce.)

addition, some of the well-defined patches of eczema found on other parts of the body are found to be caused by some member of the ringworm family. *Infectious eczematoid dermatitis* described by Engman¹ and emphasized by Fordyce² occurs in many forms. It may be exhibited as a dry, scaling dermatitis, or as large weeping areas simulating an eczema rubrum, or as crusting patches, such as described in connection with pustular eczema, or it may have all the characteristics of an acute vesicular eczema. The important feature of the disorder is its evident connection with pyogenic microorganisms, inasmuch as antecedent abscesses, ulcers, sinuses, or other pus-infected conditions are found to be in direct causal connection.

Acute Eczema.—An acute attack of eczema may be ushered in by malaise, chilliness, or the recognized symptoms of the febrile state. With or without these prodromata, the affected portion of the skin-surface becomes the seat of a burning sensation, which is soon succeeded by redness and swelling. This

tumefaction may occur upon one or upon several portions of the body at the same moment of time, and the disease throughout be limited to a single area or to several spaces; or it may extend from one to other or all regions. This extension may proceed by continuous development of the disease along the surface, or an eczema

¹ Loc cit.

² Loc cit.

of the thigh may suddenly be followed by an eczema of the face, and this by an eczema of the scrotum. Extension of eczema by the last-described course may occur when no constitutional cause can be discovered and undoubtedly is due largely to the extraordinary sensitiveness of the skin when involved in an acute attack, in consequence of which the slightest irritation produces a new focus of the disease at a distant point. This consideration is of special importance.

The tumid and erythematous surface above described soon assumes the features of one or more of the types of eczema outlined in the preceding pages. In this manner the evolution of the disease occurs, and may continue for weeks, the patient, if unrelieved, being tormented by the itching, and, if the disease be extensive, being prevented from attending to his usual vocation. Acute eczema of severe grade will frequently prostrate a strong adult, confining him to his bedchamber and often to his bed. When there is a simultaneous febrile process the emaciation and adynamia are proportioned to its severity. Weeks and even months may elapse before recovery can be pronounced complete, subacute patches of the disease lingering here and there upon the surface, crust-hidden, scale-covered, occasionally oozing from recrudescence of symptoms. Recovery, even when complete, leaves the patient, it should never be forgotten, with a skin sensitive to irritation and more prone to a fresh attack of the disease than one that has been free from such an inflammatory process.

Such is the course of an attack of acute eczema of severe grade. It must be remembered, however, that the process may be mild and subacute from the beginning, or, again, that a circumscribed patch of skin may exhibit all the features of vesicular eczema in an acute form, and under the influence of appropriate treatment may be relieved satisfactorily in the course of a few days. Lastly, acute or subacute eczema may be followed by chronic forms of the disease, the one passing into stages of the other by scarcely definable gradations.

Chronic Eczema.—The symptoms and pathology of chronic eczema are largely those of the acute form of the disease. The chief differences to be noted relate to diminished intensity of the inflammatory action, a marked tendency to recurrence and persistence of the process, and a preponderance of scaling and infiltration as contrasted with the active secretion and crusting of acute phases. It is important, however, to remember that chronic eczema is not only the frequent sequel of such acute phases, but is prone, also, to recurrent exacerbations of acute grade, during which the serous discharges, consequent crusts, and angry aspect of the affected surface do not fail to reappear. The itching so characteristic of the malady in all its manifestations is often more annoying than in the acute phases of the disease.

Chronic eczema may involve a limited region of the skin, or may invade the entire surface of the body from the head to the feet. Rarely thus generally developed, it is more frequently observed upon circumscribed patches of the integument, as, for example, the scrotum or the flexor surface of a joint, in which situation it may linger for years or

even for a lifetime, now better and now worse, or disappear for brief periods only to return with each recurrence of its cause.

Eczema is one of the diseases of the skin of most frequent occurrence. In the statistics gathered by medical men it would seem to rank first in the order of frequency, forming from 20 to 40 per cent. of dermatological cases reported.

Etiology.—The tendency in modern dermatology to regard eczema as a dermatitis without obvious cause, or one which persists after the withdrawal of a recognized irritant, necessarily places an increasing emphasis upon the importance of etiology. The fact that eczema constitutes so large a proportion of reported skin-diseases emphasizes the lack of knowledge of the factors which produce it, and the rapidity with which some of these conditions are assigned to other categories will be a measure of the progress of acquisition of etiological facts.

Some diversity of opinion exists among dermatologists as to the nature and pathogenesis of eczema. The views held have been grouped by MacLeod¹ as follows:

1. Parasitic: that eczema is produced by certain organisms acting upon the skin.
2. Toxic: that eczema is the result of the action of irritants, operative externally or internally, in a susceptible individual.
3. Neurotic: that nerve-strain or trophoneurotic influences are the efficient cause.
4. Cutaneous reaction: that eczema is a symptom merely; a response of the skin to irritants without or within.

Concerning the first hypothesis, most observers believe the disorder, *per se*, to be amicrobial. That bacteria play an important part in producing lesions is accepted by all; but these are secondary, though the disease may be prolonged by their presence and many lesions be produced that otherwise would not be present. That this latter statement is a fact is often demonstrated by the eradication of the disorder by the use of local parasitocides.

Eczema is a disease of both sexes and all ages. It is not in itself hereditary, for no child was ever born into the world with eczema. A tendency to the disorder, however, may be transmitted from parent to child, though not made manifest until adult life. Eczema may occur in individuals who are in every respect superb examples of health, but in the majority of cases it is associated with some disturbance of the general economy; and it often occurs in persons who are affected with many forms of bodily ailment, both acute and chronic. By what means these various systemic disorders favor the development of eczema is not positively known. Part of their association with the cutaneous disease may be considered as coincidence. In some instances they constitute conditions which favor the production of disease in general, eczema not excepted. Their direct influence in the production of eczema may be regarded as operating, through the nerv-

¹ Practitioner, 1906, lxxvii, p. 98.

ous, vascular, and glandular systems, upon the innervation, nutrition, secretion, and physiological growth and repair of the skin. The agencies by which this is accomplished may be considered toxic, whether they arise within the system from imperfect metabolism, or are developed as the result of microbic invasion.

Among the conditions which are frequently associated with eczema, and which probably stand in causal relation to that disorder, may be mentioned the physiological states of pregnancy, lactation, and dentition; systemic derangements which depend upon defects in digestion, assimilation, and excretion; impairment of circulation; gout, rheumatism, diabetes, nephritis, asthma, disorders of the liver, anemia, chlorosis, tuberculosis, and syphilis. The number might be extended to include all disorders which reduce the general vitality and therewith also that of the skin.

Jacquet and Jourdanet,¹ in an etiological study of occupational diseases of the hands, conclude that a close association exists between digestive troubles and occupational dermatoses, the internal irritation being the predisposing factor and the external irritation the exciting in these cases. Towle and Talbot,² in an investigation of infantile eczema and indigestion, found a frequent association of indigestion of fats and sugar in the acute exudative types. Hall³ concludes, after a thorough study of the etiology of infantile eczema, that eczema, whether occurring in infants or in adults, is a form of reaction or response of the neurocutaneous apparatus to external irritation. Practically all observers agree that the nervous system plays a part in certain eczemas. Nervous shock and prolonged mental depression are considered important factors by Morris.⁴ Johnston⁵ states that demonstrable lesions of the central, peripheral, or sympathetic nervous systems are rare in the eczematous person, but admits that shock, fright, worry, and fatigue have to be considered etiologically.

The theory of reflex irritation has been called into service to explain the sudden appearance of secondary eczematous lesions at a distance from the original focus. The view holds that inflammation of the skin is reflected from one place to another through the medium of the nervous system. Cases which apparently lend support to the reflex theory can be fully explained by assuming, first, an unconscious transfer of an external irritant from the original site to other portions of the body; or, secondly, a condition of systemic intoxication, which operates by so reducing the resistance of the entire skin that a trifling irritation at any point is sufficient to produce an eczema; or, thirdly, a lodgment within the skin of an irritant, carried to the part by the circulation or produced *in situ* through cell-degeneration resulting from trophoneurotic influences. Csillag's⁶ experiments show that

¹ *Annales*, January, 1911; abstr. *Jour. Cut. Dis.*, 1911, xxix, p. 564.

² *Amer. Jour. Dis. of Children*, 1912, x; abstr. *Jour. Cut. Dis.*, 1913, xxxi, p. 54.

³ *Brit. Jour. Derm.*, 1905, xvii, pp. 161, 203, 247, and 287.

⁴ *Diseases of the Skin*, 5th Ed., p. 291.

⁵ *Jour. Cut. Dis.*, 1913, xxxi, p. 3.

⁶ *Archiv*, 1902, lxiii, p. 213; and Orvosa Hetilap, 1906, 36; abstr. *Jour. de Pratic*, 1906, No. 16. Cf. also Fordyce, *Jour. Amer. Med. Assoc.*, June 13, 1903, p. 1621; and Pinkus, *Med. Klinik*, 1906, No. 9.

irritants applied to the skin produce a dermatitis at the area of contact, but in no other place, if care be taken to prevent accidental conveyance of the irritant to other regions. He holds that in four-fifths of all cases of acute eczema the cause can be shown to be an external agent acting upon an over-sensitive skin, and that lack of knowledge of the fact has led to the reflex theory.

The external causes of eczema are identical with those of dermatitis, and are chemical, mechanical, thermal, or actinic in their action. As stated on a preceding page, no sharp distinction can be drawn between eczema and any other dermatitis due to external causes; but those forms of dermatitis which persist after the removal of the external cause are probably due in part to, and are continued through, the action of other etiological factors, and are conveniently classed as eczema. It is doubtful if any local causes of dermatitis, acting for a limited period, could produce a persisting eczema without coöperation of other conditions, either internal or external. The large majority of all externally operating causes of dermatitis fail to be effective in the mass of individuals.

Respecting the numerous agencies operating thus externally and capable of producing the disease under consideration: they can all be referred to either solar light and heat, to contact with foreign bodies in various fluid or solid states, to toxic agencies of a widely differing nature, to traumatisms in varying degrees, and to the action of parasites. Many of these agencies coöperate, some include others, and some become effective by aggravating a disease which others have engendered. The reader is referred to the chapters on General Etiology and Dermatitis for fuller consideration of this subject. It will be sufficient to note here that acids, alkalies, antimonial and mercurial compounds, mustard, sulphur, castor-oil, capsicum, arnica, turpentine, chloroform, ether, alcohol, and a long list of other medicaments are capable, when applied to the skin, of producing a dermatitis that, in susceptible individuals, will persist after removal of the cause, and may therefore be classed as an eczema. The same statement is true of articles manipulated in many of the trades—those, for example, handled by the grocer, the baker, the confectioner, the seamstress, the ink-manufacturer, the mason, the cook, the gardener, the laundress, the painter, the dyer, the printer, the tobacconist, and the chemist.¹ Then, too, the eczema of the person exposed to severe cold, or to intense solar light and heat, aided by reflection from water, or even to excessive artificial heat, as the fire of a furnace, illustrates the action of other causes named. Pressure- and friction-effects are exhibited in the inflammatory effects produced by contact with shoes, the edges of cuffs, trusses, crutches, and corsets.

Scratching is a fruitful cause of the persistency of an eczema when the latter is well established. The experiments of Török² and Roma³

¹ Knowles, *Jour. Cut. Dis.*, 1913, xxxi, p. 11: The External Origin of Eczema, Particularly the Occupational Eczemas, as Based on a Study of 4142 Cases.

² *Archiv*, 1902, lxiii, p. 27.

³ *Ibid.*, p. 39.

indicate that mechanical irritation of the normal skin, even in patients predisposed to the disease, will not produce a vesicular eczema, though in very sensitive skins a dermatitis with an exudate may result, and if the irritation be sufficiently prolonged it may cause a lichenoid infiltration.

Water is capable of exercising an injurious effect upon the skin to the extent of producing an eczema when applied externally as a fluid in excessively cold or hot temperatures, or in the vapors of Turkish and Russian baths, or if it be rendered irritating by saline or other constituents.

External causes of eczema are at times climatic, the disease being often worse during the cold seasons. Cold winds and sudden temperature changes, especially from warm to cold, will often aggravate and prolong an existing eczema.¹

The external sources of eczematous trouble named above should be regarded simply as suggestive illustrations. Every contact with the external world sufficiently severe or prolonged to awaken the resentment of the healthy skin may be followed by the protest of the latter in the shape of an eczema; and the same may be true when even the most trivial external accidents occur to the sensitive skin of individuals especially prone to the disease.

Among other organisms² described as the cause of eczema may be mentioned the *Morococcus* of Unna.³ More recently, this organism is being regarded as identical with the *Staphylococcus epidermidis albus*. Galloway and Eyre⁴ describe cocci producing whitish cultures found in early and uncomplicated lesions of papulo-vesicular eczema. Whitfield⁵ describes a peculiar diplococcus, which grew in the form of whitish or yellowish cultures on agar and did not liquefy gelatin, isolated from that variety of eczema which manifests itself in the form of small, dry disks on the cheeks of young children.

The probability that some forms of eczema are due to toxins of different microorganisms seems to be established by the experiments of Bender and Gerlach.⁶ In a long series of control experiments, they found that inoculation of the normal skin with cultures of staphylococci produced an impetigo or a simple pyoderma, but when filtrated

¹ Corlett, Jour. Cut. Dis., 1894, vol. xii, p. 457, and Jour. Amer. Med. Assoc., December 20, 1902, p. 1583; Warde, Brit. Jour. Derm., 1903, xv, p. 349; and Corlett and Cole, Amer. Jour. Med. Sci., June, 1912, p. 710.

² For a full discussion of the parasitic and other causes of eczema consult the Transactions of the IV International Congress of Dermatology, Paris, 1900 (Compt. rendu, XIII Congr. Internat. de Méd., pp. 9-94, abstr. in Brit. Jour. Derm., 1900, xii, p. 326); also papers by Morris, Brit. Jour. Derm., 1898, x, p. 359; Roberts, ibid., 1899, xi, pp. 7 and 66; Török, Annales, 1898, s. iii, ix, p. 1073, and 1899, s. iii, x, p. 37; Sabouraud, ibid., 1899, s. iii, x, p. 305; Leredde, ibid., 1899, s. iii, x, pp. 30 and 438; Kromayer, Archiv, 1900, liii, p. 85; Scholtz et Raab, Annales, 1900, s. iv, i, p. 409; Whitfield, Brit. Jour. Derm., 1900, xii, p. 406; Schwenter-Trachsler, Monatshefte, 1903, xxxvii, p. 233; Engman, American Medicine, 1902, iv, p. 769; see also chapters by Besnier, La Pratique Dermatologique; and Unna, Mraček's Handbuch. A brief summary is to be found in MacLeod's Pathology, p. 341.

³ Monatshefte, 1899, xxix, p. 106.

⁴ Brit. Jour. Derm., 1900, xii, p. 307.

⁵ Ibid., p. 327.

⁶ Monatshefte, 1901, xxxiii, p. 149.

bouillon cultures of the same organisms, which contained no cocci but only their toxins, were employed, the result was a papulo-vesicular eczema of ordinary type. The primary vesicles so produced were sterile, but later contained staphylococci. On the other hand, Cole,¹ in a series of well-controlled experiments, failed to corroborate the above findings. Bockart² believes that in individuals predisposed to eczema staphylococci may remain inert in the mouths of follicles until some cause from without or within arouses them into activity. They then produce toxins which are diffused through the epidermis and produce eczema. The lesions so produced are invaded subsequently by cocci and other organisms, so that the later changes in eczema are due largely to other agencies. Whitfield,³ Sabouraud⁴ and others have demonstrated the causal relation of the fungus ordinarily found in tinea cruris to certain cases of eczema of the fingers and toes. The causal role played by microorganisms in the infectious eczematoid dermatitis is evident.

Pathology.—The pathological changes in eczema are those of inflammation of the skin, varying somewhat with the acuteness or chronicity of the process, and with the character and career of the exudate furnished in each expression of the disease. In most cases there is, first, a circumscribed or diffused hyperemia of the affected part, followed by dilatation and congestion of the blood-vessels of the corium, with perivascular cellular infiltration and exudation of serum, producing edema.

The process probably begins in the papillary layer, from which it extends to the epidermis, to the deeper parts of the corium, and, in exceptional cases, inward even to the subcutaneous tissue. The edematous infiltration may be quite extensive, producing marked swelling over considerable areas, or it may be slight and circumscribed. At times it appears only about the hair-follicles, producing perifollicular papules. The cell-infiltration about the vessels of the corium is formed in part of leukocytes, some of which wander outward into the rete, but it is probably composed largely of young connective-tissue cells.

The epithelial changes in eczema vary greatly with the stage, intensity, and type of the disease. It is not determined definitely whether these changes are always dependent upon and follow the conditions described above in the corium, or whether they are usually, or even rarely, primary in origin. It is probable that they are secondary to the vascular changes in the corium, though some observers, including Unna and Leloir, believe that in most cases the epithelium is first affected. In practically all forms of eczema there is a parenchymatous edema of the epithelial cells, especially of the transitional layers, as a result of which there is imperfect keratinization (parakeratosis) of the horny

¹ Archiv, 1913, cxiv, Sec. 3, p. 207; abstr. Jour. Cut. Dis., 1913, xxxi, p. 593.

² Monatshefte, 1901, xxxiii, p. 421.

³ Lancet, July 25, 1908, and Brit. Jour. Derm., 1911, xxiii, p. 36.

⁴ Annales, June, 1910, p. 289.

layers, the cells of which contain some moisture, retain imperfect nuclei, and are exfoliated in scales. In acute erythematous eczema running a brief course the epithelial changes may be limited to this parakeratosis, but in most cases they are followed by vesicle-formation in the upper part of the rete. The manner in which vesicles are formed is a matter of dispute. Some observers report that the first vesicles of acute eczema apparently are due to the formation in a number of contiguous cells of a clear space between the nucleus and the protoplasm, which enlarges until there is left merely a meshwork filled with serum. Other writers¹ state that the prickle-cells are forced apart mechanically by the intercellular edema forming small spaces. The vesicles so produced may be unilocular, but often are subdivided by remnants of prickle-cells into several chambers. The edema may cause a separation of practically all the cells, producing Unna's "spongy metamorphosis" of the epidermis. The intracellular edema described above follows. As a result of compression, the prickle-cells about the vesicle may assume a spindle-shape. The vesicles, though usually superficially situated, may be found in any part of the rete. MacLeod states that they form in the region of least resistance, which in eczema is commonly the superficial portion of the prickle-cell layer, but when the edema appears with unusual rapidity the greatest strain is put on the cells nearest the basal layer, where the vesicles then are formed. Again, the edema may diminish somewhat, permitting the cells beneath the vesicles to become cornified, thus locating the vesicle entirely within the stratum corneum. The vesicles contain, first, serum with fibrin; later, leukocytes in varying numbers, more or less degenerated epithelial cells, and nuclei. As a result of more active degeneration of cells, or of secondary infection, the vesicles become pustules, the contents of which dry on the surface, forming thick crusts. In very acute cases, with an abundant exudate, the horny layer may be raised from the rete to form vesicles or bullæ. According to Unna, vesicles in the later stages of eczema are due solely to an intercellular edema.

In eczema rubrum the horny layer is raised from the rete and destroyed without true vesicle-formation. The rete is thus exposed directly to the air, or is partly covered by an amorphous coating of dried serum and degenerated cells.

In the later stages of eczema there is more or less hypertrophy of the rete (Unna's acanthosis), with corresponding enlargement of the papillæ, forming papules and elevated, thickened areas. In chronic cases the cell-infiltration and proliferation in the corium become very conspicuous, producing the thickening of the skin so characteristic of patches of chronic eczema. In these cases the papillæ are larger than normal, and the vessels of the corium are dilated and surrounded by connective-tissue cells. The process may extend to the subcutaneous fatty layer, which then loses much of its fat, and becomes dense and

¹ MacLeod, Pathology, p. 101.

attached to the skin. Hypertrophy of connective tissue and lymphatic obstruction, with elephantiasis changes, may follow. In these cases the sebaceous and coil-glands and the hair-follicles may be partially or entirely destroyed by undergoing degeneration and atrophy.

According to Ehrmann and Fick,¹ three conditions, viz., acanthosis, spongiosis, and parakeratosis, are always to be found in eczema, the degree of development of each varying with the type of the disease.

The fluid exuded in eczema, in vesiculation or in a free discharge from the surface, is always characteristic. Though in the earliest vesicles it is a blood-serum, it soon becomes a yellowish-white, sticky and syrupy liquid, feebly alkaline in reaction and deposits albumin in abundance when treated with heat and nitric acid. Exposed to the air, it desiccates in light-yellowish to brownish, friable crusts, resembling honey or gum.

Increase in the pigment-particles distributed to the epithelia of the rete is characteristic of the chronic forms of eczema, and more especially of those in which the circulation is somewhat impeded by the influence of gravity, as, for example, in the lower extremities.

Diagnosis.—Though of a dozen consecutive cases of eczema no two may look alike, yet they all have some characteristics in common and the diagnosis is usually attended with little difficulty. Eczema in its manifestations is such a protean disease and is, moreover, of such frequent occurrence, that it is necessary to establish a differential diagnosis between it and a large number of other cutaneous disorders. The more important of these are named below in alphabetical order for convenience of reference, the distinctive peculiarities of each being briefly appended. In making a diagnosis it must be remembered that eczema may coexist with any other disease of the skin, and that it very frequently thus complicates such cutaneous disorders as seborrhea, psoriasis, and scabies.

Acne.—Acne occurs chiefly on the face, the neck, and the back of the trunk, and its pustular forms may be mistaken for eczema of the same localities; but pustular acne is usually accompanied by a deeper-seated infiltration than the similar lesions of eczema, and this infiltration is also generally limited to the sebaceous glands or the periglandular tissue. In eczema the itching is often severe, while in acne the subjective sensations are those of heat or burning. Comedones intermingled with the pustules of acne will aid in distinguishing the two.

Erythematous eczema of the face is to be distinguished from *acne rosacea* by the more generalized infiltration of the former, its production of itching, and its greater diffusion over the face; while *acne rosacea* is limited more often to the cheeks, nose, and brow, and to the regions adjacent to these parts. The patch of erythematous eczema is hot, that of *acne rosacea* is cold, to the touch. The former is seen in infancy, the latter is rare in that period of life. *Acne rosacea* in

¹ Kompendium der Speziellen Histopathologie der Haut, Wien, 1906.

many cases is distinguished readily by the development of visible blood-vessels in the skin of the cheeks or the nasal region. Lastly, in erythematous eczema the eyelids may suffer, while in acne rosacea this is the exception. In severe forms of acne the subepidermic pus-formation and the resulting scar will prove significant.

Dermatitis.—Dermatitis of artificial origin is to be distinguished from idiopathic eczema rather by its history than by special differences in the appearance or evolution of the lesions. In many cases the two affections are indistinguishable. A history of traumatism or of the external application of irritant or toxic articles will often serve to distinguish the two. When the dermatitis has been produced by an externally applied irritant, the resulting inflammation of the skin will often exactly outline the area of contact. Dermatitis of artificial production is usually sudden in its onset, the date of which will nearly correspond with the time of operation of an exciting cause. The subsidence of the symptoms after the withdrawal of the cause will also point to the nature of the affection. Eczema is also much more capricious in its distribution and career than dermatitis.

Erysipelas.—Erysipelas is generally accompanied by febrile symptoms; in some cases bullæ appear. The affected surface is reddened, much more swollen than in eczema, owing to the involvement of deeper tissues, and it exhibits besides a characteristic shining appearance, which is always absent in erythematous eczema. The line of demarcation between the affected and unaffected portions of the skin is usually distinctly defined in erysipelas, ill-defined in eczema, and in the former disease is markedly tender. Erysipelas is an exceedingly acute affection and spreads from one point to another with a rapidity that is never noticed in eczema; the latter disease, moreover, usually exhibits under a lens its minute papules or vesicles. In eczema, also, when occurring upon the face in the erythematous form, the scalp is usually spared, while erysipelas tends to invade the scalp and the regions covered by the beard.

Erythema.—Eczema is to be distinguished from the forms of erythema which are due to hyperemia only by the presence of an inflammatory process. The erythema simplex which advances to exudation at once transgresses the artificial line of distinction between the purely congestive and the purely exudative disorders. It must therefore be remembered that many eczemas begin as erythemata, and that clinically the latter may represent but a stage in the morbid process. The discharge in erythema intertrigo results from imprisoned or from chemically altered sweat, and will not stiffen linen, as does the serous exudation of vesicular eczema, for example. Erythema multiforme, an affection really on the border-line between the two pathological classes here sought to be distinguished, will be recognized by the absence of severe itching and by the recurrence of the disorder at certain special seasons of the year; while erythema papulosum, erythema tuberosum, and erythema nodosum display solid elevations of the skin-surface much exceeding in size the minute lesions of papular eczema.

Herpes.—Eczema, in the minds of many, is so associated with the occurrence of a vesicle that other vesicular disorders are likely to be confounded with it. But in herpes febrilis the vesicles usually are grouped about the mucous outlets of the body, and when actually under observation are seen to exceed in size the minute and transitory lesions of vesicular eczema. In herpes zoster, with the limitation of the eruption to the course of a nerve on one side of the body, and the production of grouped vesicles of a larger size and more persistent type, there is commonly a history of precedent or coincident neuralgic pain. The subjective sensation in the skin is a decided burning rather than itching, and there is a possibility of the subsequent production of scars.

Impetigo.—In these forms of disease the pustular lesions are usually isolated, do not spring from an infiltrated surface on which other lesions may be visible, and are unaccompanied by the intense itching which is characteristic of eczema. The pustules, moreover, are larger and the resulting crusts, as a rule, are bulkier and darker colored than those in eczema. Again, in pustular eczema the cutaneous affection usually occurs in one or more patches, while in impetigo a dozen or more isolated pustules may be irregularly scattered over the entire surface of the body. In impetigo there may be a history of extension of the disease from one member of a family to another.

Lichen Planus.—Papular eczema may be confounded with lichen planus, but in the latter disease the typical papule has an irregular or polygonal base; a flat or umbilicated apex, which is covered with a thin, closely adherent, varnished-looking scale; and a violaceous or dull-crimson hue. The papules of eczema have round or oval bases, acuminate or rounded summits, and are brighter red in color. They also form more rapidly and undergo change of type more frequently than the more persistent papules of lichen planus. The patches of lichen planus are more sharply defined than those of eczema and are usually angular or linear in outline. The lesions of lichen planus on disappearing leave a characteristic brown or sepia-tinted pigmentation.

Lupus Erythematosus.—Lupus erythematosus greatly resembles certain forms of squamous eczema. The great chronicity of lupus; the firm attachment of the scales; the symmetrical distribution of many patches upon the face; the association of some forms of the disease with the sebaceous glands; the definite border of each involved area; and, above all, the discovery of a cicatrix left by the morbid processes, will sufficiently distinguish the disorder. In eczema there are usually itching, often vesiculation, more rapid extension of the borders of a single patch, and scales much more loosely attached than in erythematosus lupus. The scales of eczema are never provided, as in lupus erythematosus, with stalactiform plugs on the inferior surface.

Lupus Vulgaris.—Lupus vulgaris is readily distinguished from eczema by its more chronic career, by its larger papules and tubercles of dark reddish-brown hue, and by every one of its destructive processes, none of which is ever recognized in eczema.

Granuloma Fungoides.—Granuloma fungoides, in its earliest stages, may be indistinguishable clinically from some forms of localized or even generalized eczema. As a rule, however, the early erythematous and eczematoid lesions of mycosis fungoides can be recognized by their characteristic gyrate outlines, assuming, as they do, the shape of a kidney, horseshoe, half-moon, and other fantastic, more or less circinate, forms. These lesions may change frequently in form and location, or may disappear spontaneously, to return in the same or in new sites. They differ further from eczema in being located on any or every part of the body, independently of external influences, and in failing to respond to treatment during months or years. After the formation of characteristic thickened and elevated plaques, the diagnosis is not difficult.

Pediculosis.—As eczema is often induced by lice upon the head, the pubes, or the clothing, it is always necessary to exclude the operation of such causes for both diagnostic and therapeutic purposes. Eczema limited to the pubic region or to the pubic and axillary regions should suggest careful examination of the skin and the hairs for the discovery of the crab-lice. As for the *Pediculus corporis*, it should be the rule of the physician (whatever the social position or refinement of his patient) to search in a suspected case for evidence of the parasite upon the under surface of the clothing worn next the skin, at the instant of its removal and while the patient supposes him to be busied with the inspection of the cutaneous lesions. The excoriations produced by scratching wounds inflicted by body-lice are usually out of all proportion to the amount of skin-disease present; and this excoriation is the most significant of all symptoms next to the discovery of the *corpus delicti*. Head-lice may precede or may follow eczema of the scalp, but either they or their ova (nits), clinging in numbers to the hairs, will be visible to him who looks carefully for them.

Pemphigus and Pityriasis Rubra.—The large, isolated bullæ of pemphigus vulgaris are never seen in eczema. In pemphigus foliaceus the lesions are succeeded by the formation of pastry-like crusts, serous exudation, considerable soreness, and the eventual production of an extensive and often fatal exfoliative dermatitis. Marasmus gradually, or in some cases rapidly, ensues, while, as a rule, itching and infiltration are not present. The disease known as pityriasis rubra is equally rare and fatal, and, though unattended by the production of bullæ, is characterized by an abundant epidermic exfoliation; itching and infiltration being either entirely wanting or insignificant in comparison with the other symptoms present. The scales, too, are fine and branny, or larger, papery, and thin; there are no vesiculation and moisture, and little, if any, infiltration of the skin. The integument is, moreover, of a uniformly reddish hue. Both pemphigus foliaceus and pityriasis rubra are particularly liable to be complicated with chills or with uncontrollable diarrhea. Without question, many of the reported cases of so-called pityriasis rubra are instances of squamous eczema or of simple exfoliative dermatitis. Here the limitation of the disease

to one or more patches upon the body, the severe itching, and the distinct infiltration of the patch point to the eczematous character of the disease. Observation of such patients will finally show, in many cases, that there is occasional weeping from the surface.

Pityriasis Rubra Pilaris often resembles in a high degree, and it may indeed be confused with, the squamous forms of eczema. In general, there are not found in eczema characteristic lichenoid papules formed about the hair-follicles, with their hyperkeratinized cap sheathing the follicular orifice. Nor is the selection of the extremities, and especially the dorsal aspect of the fingers, characteristic of eczema. In eczema there are usually distinct marks of scratching, that may wholly be wanting in pityriasis rubra pilaris; and the latter has in most cases a more chronic course.

Prurigo.—In the prurigo of Hebra, a disease exceedingly rare in America, there are infiltration, intense itching, and numerous minute and larger papules. But this disease usually occurs within a year or two after birth and lasts for a lifetime, extending generally over the greater part of the body, sparing only the palms and soles (which eczema does not), and being accompanied by inguinal adenopathy.

Pruritus.—In pruritus, often confounded with prurigo, there is itching without lesion of the skin save that induced by scratching to relieve the sensation. Hence, pruritus without scratching will not reveal a cutaneous disease, while pruritus with scratching will exhibit either excoriations or a dermatitis induced by the attacks made upon the skin. The former condition, however, is rarely noted. The distinction will be clear when it is remembered, first, that pruritus is usually of a paroxysmal character, being worse regularly at certain hours or seasons; second, that pruritus not originating in a cutaneous lesion, but indirectly producing the latter by the medium of the finger-nails, never exhibits as much cutaneous excoriation as the skin attacked with eczema. The impressive features here are always the disproportion between the complaint of the patient and the visible symptoms, and the vast preponderance of all lesions in those regions of the body most accessible to the hands, such as the anterior faces of the limbs, the genital region, and the lower abdomen.

Psoriasis.—Psoriasis and eczema in typical forms are distinct. Variations in type from one to the other furnish many obscure cases. The following are the chief diagnostic points in psoriasis: sharp definition of contour of patch; abundance and lustrous hue of the scales; absence of moisture; vascularity of tissue beneath the scales; sites of election on posterior aspect of the trunk and extensor surfaces of limbs; chronicity in course; uniformity of lesions; and usually absence of itching. In eczema there are an ill-defined contour; usually scanty scales, not having a nacreous hue; a preference for the flexor surfaces of the extremities, though the disease may occur in any portion of the body; generally, at some period in its course, a history of moisture; polymorphism as regards lesions; and a marked intensity of subjective sensations. Upon the scalp psoriasis is prone to extend beyond the

hairy border in a fillet stretching across the upper portion of the forehead, thence irregularly down in front of the ears; while in eczema of the face, when the scalp is also invaded, the disease extends to the lower forehead, the lips, nose, cheeks, or chin, regions which are relatively spared by psoriasis. Finally, the two diseases, in doubtful cases, will generally be distinguished by carefully searching the entire surface of the body, upon some part of which in psoriasis there will usually be discovered a typical patch.

Scabies.—Scabies is really an artificial dermatitis induced by the incursions of the *Acarus scabiei*, and its lesions are thus very similar to those of eczema. In scabies, however, the itching is intense, and the recently formed papules, vesicles, and pustules are more distinct and isolated than in eczema. The discovery of the parasite, especially if there be a history of contagion, and the localization of the disease in its sites of preference, will at once determine the diagnosis. Scabies never attacks the scalp. Its sites of preference are in both sexes the fingers, hands, wrists, and axillæ; in women the breast and the nipple; in men the penis; and in children the buttocks. The presence of the acarian furrow, if the disease has existed for some time, and the appearance of minute blackish dots or points upon or about the lesions, usually suffice to establish the nature of the disease.

Sycosis.—Both the hyphogenous and the coccogenous forms of sycosis are limited to the region of the beard, while eczema of the hairy portions of the face will usually be found to affect other parts. In eczema the itching is severe, the exudation spreads beyond the limits of the beard, and the discharge is characteristic; while in both forms of sycosis there is less oozing and the subjective symptoms are trivial. The discovery of the parasite in the root of the shaft of the hair will at once distinguish the hyphogenous forms of the disease. In coccogenous sycosis each pustule is perforated by a hair. Eczema limited to the region of the beard is even rarer than the two varieties of sycosis. The circumscribed indurations and tuberculations of the affection produced by the *Trichophyton*s, as well as the loosening of the hairs in their follicles, constitute further distinctive differences.

Syphilis.—Several syphilitic eruptions resemble certain forms of eczema. In the eruptions due to syphilis, however, there is usually a history of infection; of involvement of the glands and mucous surfaces; of ulceration and cicatrices in advanced periods; and, especially in the case of infants with an eczema-like eruption, a history of snuffles. The intense itching of eczema is characteristic of no one of the syphilides, and the latter are remarkable for their tendency to occur with a circular or partially circular outline, and to be covered with bulky, malodorous crusts. A point worthy of note is that, compared with chronic eczematous affections, a syphilitic eruption limited for an equal period of time to one locality will often ulcerate or exhibit evidences of repair, by scar-tissue, no such results occurring in eczema.

Syphilis of the palms and soles exhibits very distinct outlines in the usually circular, circumscribed, and deeply infiltrated patches present,

which are often symmetrical in development, or are at least situated on both sides of the body, even if more fully developed upon one limb. Syphilitic pustules upon the scalp usually rise above superficial but well-defined ulcers. Syphilitic eruptions encircling the mouth in children are less angry-looking and formidable than those of severe eczema of the same region, being often made up of flattened papules, moist or scaling, grouped in circles about the lips, with mucous patches at the angles.

Trichophytosis Corporis.—In ringworm there should be a history of contagion, microscopical discovery of the vegetable parasite, distinct contour of all separate patches, and absence of marked subjective sensations and of discharge. In ringworm of the scalp the hairs, loosened in their follicles, are usually either brittle or are actually broken at a short distance from the scalp; the scales are fine, dirty-white, and not torn from the surface by the finger-nails. In eczema the hairs are unaffected, and their extraction is productive of pain. In ringworm of the body the patches are distinctly circular, are more scaly or papular at periphery than centre, and, moreover, yield with promptness to the action of a parasiticide. Occurring about the thighs and ano-genital region, the disease may be complicated by eczema, but the characteristic “festooning” of the advancing border of the patch downward along the thigh, or upward over the pubes, will suggest a microscopical examination of the scales scraped from the surface.

Tinea Favosa.—The large, friable, dirty crusts of an old and neglected favus of the scalp might be mistaken for the crusts of eczema of the same part; but here the exudation is slight, and there is little scratching, as in eczema, hence no history of discharge. The odor, moreover, is peculiar. In case of uncertainty, a careful search will reveal a few characteristic cup-shaped and yellow crusts, or the microscope will demonstrate the parasitic nature of the disorder.

Tinea Versicolor.—In this disease, also, the microscope will reveal, beneath the epidermal plates, the spores and filaments of the fungus which produces the ailment. From eczema the disease is easily distinguished by the absence of infiltration and of any history of inflammation; by the very slight subjective sensation it produces; and by its peculiar fawn- to chocolate-colored, slightly yellowish patches, which are covered with superficial furfuraceous scales, are limited to the covered parts of the body and often to the anterior surface of the trunk, and are readily removed by the action of a parasiticide.

Urticaria.—In papular forms of this disease there may be a resemblance to eczema. This resemblance is more marked in children, as here the two diseases may be intermingled. Characteristic wheals often occur by the side of eczematous patches, but, as a rule, urticarial lesions are less grouped, more generally disseminated, more evanescent, and much less scratched.

Treatment.—The treatment of eczema usually presents a complicated problem. The causes of the disease are numerous, frequently obscure, and when discovered are often difficult to remove. Eczema

shows little tendency to spontaneous recovery, but tends rather to persist, to spread to contiguous or distant parts of the body, and to recur. Although many cases of the disease respond well to local treatment alone, if the affected surface can be given absolute rest and kept constantly covered with the desired dressing, such ideal treatment can rarely be carried out except with hospital patients. Moreover, in many cases of eczema the general health of the patient must be improved before local treatment can be effective. The nutrition and functional activity of the skin depend largely upon the condition of the general system, for the skin is but one of many organs in a complex organism. It follows, also, that every serious disease of the skin must interfere more or less with the general health. The fear that too rapid a cure of eczema may result in disease of deeper-seated organs is baseless. The sudden improvement or disappearance of an acute eczema coincidently with the development of a pneumonia or other grave disorder may be explained by the rapid withdrawal of a large amount of blood from the skin-surface to the newly-congested organ. The improvement in the eczema is thus a result and not a cause of the deeper-seated disease.

The treatment of eczema requires both local and constitutional management.

Constitutional Treatment.—In many cases internal treatment may be wholly ignored, and eczema be successfully controlled by local measures alone, even though there be coincident systemic disease. Often, however, the eczema is an external expression or result of other pathological conditions, which must be removed before the eczema can be permanently cured. These systemic disorders vary widely, ranging through the whole field of internal medicine and hygiene. In these pages a few suggestions only can be given regarding the internal treatment of eczema, the major portion of such treatment depending entirely on individual findings. It is often necessary not only to relieve disease of other organs, but also to study the patient's temperament, habits of eating, drinking, bathing, and sleeping, before an obscure cause of stubborn eczema can be found and removed.

Diet.—No absolute rule can be laid down regarding the diet in eczema. Each individual should be given the quantity and quality of food that will best nourish his body without interfering with digestion and elimination. The anemic, strumous, and poorly nourished subject should be given sufficient fresh beef, mutton, eggs, milk, cream, vegetables, and other nourishing foods. Cod-liver oil, butter, and other fats, when easily digested, are of special value, as also are the various malt-preparations, particularly when digestion of the carbohydrates is at fault. In the plethoric, the overfed, the gouty, and in those suffering from faulty digestion and elimination, a diet restricted to the lowest point consistent with the health of the individual is often of the greatest importance. In these cases excellent results are obtained by limiting the patient to a diet of bread and milk, or of milk alone, or of milk and seltzer-water, for several weeks. In general, the diet

allowed the eczematous patient should be limited to the most digestible articles of food and should exclude those (a list of which is given in the chapter on Urticaria) capable of exciting cutaneous irritation. Cooked vegetables, fruit, and a small quantity of fresh meat may be permitted; but starchy articles in excess, hot breads and cakes, pastry, confectionery, cheese, pickles and pickled meats, the heavier vegetables, shell-fish, salted fish and meats, and pork and veal should be avoided. Coffee, tea, and cocoa are in the doubtful list, as they are positively injurious to some patients and apparently without effect on others. Water, as free from mineral constituents as procurable, may be taken freely between meals. Alcohol in every form is contraindicated save in conditions of debility, or in case of its previous habitual use in moderation by persons of advanced years. In gouty patients the dietary should be of the strictest appropriate to that condition, and in diabetic eczema the regimen proper in glycosuria is observed with great benefit in most cases.

Internal Medication.—There are no specifics for eczema. Such remedies only should be given as are indicated by the general condition of the individual. The chief object of the constitutional, and also of the local, treatment of eczema is to remove all sources of irritation of the inflamed skin.

An attempt to relieve itching by the use of anodynes internally is rarely necessary, and usually aggravates the disorder. Opium and its preparations increase the itching, though in full doses they relieve temporarily. With some patients, and especially children, full doses of quinin may relieve itching. Aspirin is of value as an antipruritic. Less frequently, full doses of calcium chlorid, largely diluted with water, may serve the same purpose. In an emergency, chloral, phenacetin, sulphonal, or even the bromids, may be given, but, like opium, they all are liable to aggravate the itching after a first anodyne effect has passed.

In the management of acute eczema cooling draughts are useful; and in all cases occurring in patients who are plethoric or constipated, or who suffer from other symptoms of imperfect excretion, aperients and cathartics are needed. Often a brisk mercurial purgative in the form of blue mass or the compound cathartic pill may be ordered at the outset. Five grains (0.33) of blue mass or one to three grains (0.06–0.2) of calomel may be given each night, followed by a saline laxative in the morning, for several successive days, or once every third or fourth day. A tenth of a grain (0.006) of calomel combined with sodium bicarbonate may be given every hour for a day or two, and then three or four times daily for two weeks or longer, if at the same time salines are used to keep the bowels freely open. The rhubarb-and-soda mixture answers well in some cases. Podophyllin, or the familiar combination, nux vomica and aloes, may be substituted for these articles. The saline cathartics, whether employed in medicinal formulæ or in natural mineral waters, such as the Hathorn, Karlsbad, Hunyadi János, or Friedrichshall, are exceedingly useful in the

management of most cases. The following is a valuable combination, often advised for cases in which both iron and magnesium sulphate are indicated:

R—Magnes. sulphat.,	℥ij;	60	66
Acid. sulphur. dil.,	f℥ij;	8	
Ferri sulph.,	℥ss;		
Sodii chlorid.,	℥j;	4	
Cardamom. tinct. comp.,	f℥iv;	15	
Aq. dest.,	ad. ℥ss;	240	M.

Filtra.

Sig.—A tablespoonful before breakfast in a tumblerful of cool or of hot water.

An excellent remedy for some cases is from 15 to 20 drops of a fluid containing 2 parts of the fluid extract of cascara sagrada to 1 part each of glycerin and tincture of aloes, the dose to be taken at bedtime or before breakfast in a small glassful of water. A full dose of castor-oil on retiring is an excellent remedy in many neurotic cases, and may be continued for weeks if needed.

In some cases of renal derangement the alkaline diuretics are indicated, such as potassium acetate, carbonate, or citrate, administered with nitre, squills, caffein, or lithium benzoate in from 3 to 5 grain (0.2–0.33) doses before meals, and in gouty cases colchicum, Vichy water, etc. Distilled or other pure water, or in suitable cases the alkaline spring-waters, taken in large quantities before meals and between meals, are very valuable as diuretics and as a means of encouraging elimination. In patients suffering from hyperchlorhydria, liquor potassæ, sodium bicarbonate, ammonium carbonate, or milk of magnesia may be required. Salol and allied drugs are often of value.

Aloes and iron, or aloes and ergot, are indicated in special cases. Where diuretics and alkalies are both indicated, the following formula is often of service:

R—Magnes. sulphat.,	℥ss;	15	2
Magnes. carbonat.,	℥j;	4	
Colchici tinct.,	f℥ss;	2	
Menth. pip. ol.,	℥iij;		
Aq. dest.,	f℥vj;	180	
			M.

Sig.—Two tablespoonfuls in a wineglassful of water every three or four hours.

Cod-liver oil is indicated in all cases of struma and tuberculosis; calcium phosphate in bronchitis; iron in anemia and chlorosis; strychnin, hypophosphites, and other nerve-tonics in neurotic cases. Antimony in small doses as an alterative and nerve-tonic or in large doses to reduce vascular pressure is often of value.

In fleshy children affected with eczema calomel internally is a valuable remedy. From $\frac{1}{2}$ grain to 2 grains (0.03–0.133), with 2 to 3 (0.13–0.2) of rhubarb, rubbed up with 5 grains (0.33) of calcined magnesia, may be given once in a day to an infant; or $\frac{1}{20}$ of a grain (0.003) of calomel, rubbed up with sugar of milk, may be given three times daily for ten or twelve days. Small doses of the unsipped syrup of rhubarb, with or without magnesia, may be required for the constipation of infants, or from 1 to 3 drachms (4–12.) each of powdered

rhubarb and sodium bicarbonate in 4 ounces (120.) of peppermint-water, of which a teaspoonful may be administered two or three times or oftener daily. Quinin, strychnin, syrup of ferrous iodid, and wine of iron may also be used with advantage when indicated in these little patients.

Beside those enumerated above may be named the following articles, which, after internal administration, have been reported as efficient in the hands of various authorities: calx sulphurata, viola tricolor, sodium hyposulphite, ichthyol, chrysarobin, tar, phenol, sulphur, pilocarpin, and turpentine. Arsenic, which has been so largely employed by the general practitioner in eczema and in other disorders of the skin, is an uncertain remedy in all cutaneous diseases; it is equally uncertain in eczema, and has unquestionably aggravated as many cases as it has relieved. Its value in some chronic papular and squamous forms of the disease is undoubted, and in small doses as a nerve-tonic it is often of value, but it should never be given in acute cases or where there is any digestive disturbance.

Sunlight, fresh air, suitable clothing, and due *régime* as to pleasure and business, must be, for many patients, controlled by the physician. These agencies do not cure eczema; but they do much to aid in its management; they may do more, if neglected, to permit its aggravation. Crocker advocates counter-irritation over the spine—over the nape of the neck for eczemas of the upper segment of the body; over the dorso-lumbar vertebræ for the lower parts. Jackson has used the ice-bag with advantage in the same way. Counter-irritation of the corresponding part of the lateral half of the body for the relief of an eczematous patch of long standing limited strictly to the other side may also be employed in rare cases.

Local Treatment.—Local treatment is of value in all cases of eczema, is usually imperative, and often is the only treatment necessary. The remedies recommended for external application in the various forms and phases of eczema are so numerous and varied that barely to mention all would require many pages; and not even the expert can be sufficiently familiar with them all to use each intelligently. A comparatively small number of remedies skillfully handled will suffice in all but rare cases. It often happens that in a given type of the disease a treatment which one physician uses with brilliant success fails utterly to serve a fellow-practitioner who is equally skillful, but who is less familiar with this particular method. One of the most common errors in the local treatment of eczema lies in the frequency with which, in a difficult case, a succession of new medicaments is tried instead of studying more carefully the details of application of familiar remedies. It must not be forgotten that each individual skin, like its possessor, has its idiosyncrasies. A remedy that in a given type of the disease will commonly give prompt relief may in others prove of no benefit and even aggravate the condition. An idiosyncrasy may exist forbidding the use of particular drugs, such as phenol, glycerin, resorcin, etc., or it may prevent the employment of certain classes of

applications, as, for example, ointments, powders, lotions, etc. The choice of remedies must further be influenced in each case by a consideration of the type or phase, severity, and duration of the disease; of the region and extent of surface involved; and of the age, occupation, and climatic and other surroundings of the patient.

The general objects and principles of treatment in eczema may conveniently be grouped under the following heads: (1) exclusion of all sources of irritation to the skin; (2) relief from itching, burning, and other morbid sensations; (3) antiseptic dressing; (4) reduction of local congestion in acute, and stimulation of circulation in chronic, cases; (5) repair of the horny layer in acute, and destruction of the thickened and abnormally keratinized horny layer in chronic, forms of the disease.

1. *Exclusion of All Sources of Irritation.*—This is one of the most important, the most varied, and often the most difficult and complex problems. Frequently, a simple protective dressing is all that is required; more commonly, the object is not so readily attained. Irritation of the skin due to its malnutrition or to conditions of ill health must be relieved in accordance with the principles of internal medicine, as has been indicated in discussing the internal treatment of eczema.

The exclusion of all sources of irritation necessitates, secondly, the avoidance of all injurious external contacts. Complete rest is advisable when feasible. The inflamed skin, like an inflamed joint, recovers much more rapidly when put at complete rest than is possible under other circumstances.

Next is involved the exclusion of all topical irritants (in the hands of either physician or patient) designed to relieve the disorder, but having a precisely opposite effect.

Lastly, the exclusion of all sources of irritation necessitates protecting the involved surface from the excoriations and other traumatisms produced by scratching, rubbing, and excessive washing of the eczematous skin, and from exposure of the inflamed surface to the air. The various applications and protective dressings here serve their purpose, but in the case of adults some restraint to prevent rubbing and scratching is also necessary; in the case of infants this restraint may need to be enforced. Fixed dressings are often of great value in immobilizing a part, or in preventing friction, bruising, or other injury to the inflamed surface. A light elbow-splint to prevent flexion of the joint often is of service in keeping the fingers from the face. Most patients have to be repeatedly and forcibly impressed with the fact that a few minutes of scratching or rubbing, or one untimely washing of the inflamed surface, or its unnecessary exposure to the air, may undo all that has been gained in several days of patient and successful treatment.

2. *Relief of Itching.*—The itching, burning, and other sensations which accompany eczema are usually largely or entirely allayed by the complete protection of the skin from irritation. Antipruritics are, however, frequently desirable and necessary. Among the best are phenol, hydrocyanic acid, camphor, menthol, and salicylic acid, each in the strength of 0.5 to 2 per cent. (rarely stronger), in lotions,

ointments, jellies, pastes, etc. Saturated solutions of boric acid, or the lead-and-opium wash, answer in many acute cases. If a remedy does not relieve the itching, it should be changed for one that will, unless the fault lies in the method of application. The most common error in the use of local remedies is found in the five- and ten-minute, or longer, intervals during which the skin is not protected, either as a matter of convenience or with a view to its appearance or as a result of carelessness in removing and reapplying the dressings. Exposure of an acutely inflamed surface to the air for a few seconds only may be sufficient to arouse a violent attack of itching or burning. The relief of itching by the use of drugs internally is considered under the head of internal medication.

3. *Antiseptic Dressing*.—It is not known to what extent eczema may be due to, or may be modified by, the various microorganisms that come in contact with the skin, but severe cases are undoubtedly complicated and prolonged by the action of such bacteria, and it is well in every case, when possible, to prevent their activity. Simple protection does much to accomplish this end, while, fortunately, most of the remedies used as antipruritics are also more or less parasitocidal. In certain forms of the disease, such as seborrheic dermatitis, sulphur, resorcin, and other parasitocides are necessary.

4. *Relief of Local Congestion*.—This is accomplished by position, compression, internal treatment, and largely by the removal of external irritation. Occasionally, a direct astringent action may be obtained by the use of lead-water, lime-water, or by some of the rapidly drying jellies or glycerogelatin preparations. In chronic eczema passive congestion is removed by means of stimulating washes, soaps, ointments, etc.

5. *Repair of the Epidermis*.—If the preceding indications are fulfilled, repair takes place naturally. It may be aided and hastened somewhat in suitable cases by the use of very mildly stimulating remedies, such as weak preparations of sulphur, resorcin, ichthyol, thiol, tar, etc. In chronic cases with much thickening of the epidermis, the abnormally and imperfectly keratinized horny layer must be destroyed and removed before the process of repair can begin. For this purpose salicylic acid in ointment is especially valuable. Other remedies used for the purpose are tar, sulphur, resorcin, chrysarobin, and pyrogallol.

Local Treatment of Different Types and Phases of Eczema.—1. ACUTE AND SUBACUTE ECZEMA.—In selecting remedies for use on the acutely inflamed integument it is always best to begin with one that is mild and soothing, and to make the application to a small surface only, until it can be determined that the preparation will operate favorably in the case at hand. So greatly do individuals differ in their response to a given remedy that it is often well to order an alternative treatment in case the first does not prove satisfactory. A remedy that induces comfort and brings relief to the patient will usually do good, while one that irritates will almost invariably do harm.

Cleansing of the Skin.—In acute eczema the inflamed skin rarely tolerates pure water. The surface should be washed as little as possible (often not at all), and this without soap, and with soft water that has been softened by the addition of borax, soda, bran, oatmeal, gelatin, or other demulcent, as outlined in the description of baths in the chapter on General Therapeutics. Hot water thus prepared and applied either as a lotion, a bath, a fomentation, or by sponging (without rubbing), cleanses the part, is frequently grateful, and alleviates the itching. When employed otherwise than as a fomentation, its use should immediately be followed, as soon as the part is carefully dried, by the medicament selected for topical application. During the acute stages cleansing of the skin can usually be accomplished best by the use of olive- or other oil. For the removal of crusts and other accumulations a bland oil may be poured frequently over the surface with gentle inunction or be applied on lint or gauze. Even the oils, however, are at times sources of irritation. They are made more soothing if combined with an equal part of liquor calcis to form a liniment. The addition of 1 per cent. of phenol makes the mixture antipruritic and mildly antiseptic. In many cases the value of these applications for the removal of crusts is greatly enhanced by surrounding the whole with oiled silk or other impermeable tissue. Such dressing should not be applied continuously for many hours at a time, for fear of macerating and weakening the skin. Flaxseed, starch, or other poultices may in exceptional cases be applied for a few hours at a time to soften crusts and other accumulations on the surface. They should not be retained long enough to produce congestion and maceration of the skin.

Powders.—Powders are useful in acute erythematous or papular eczema, in intertrigo, and occasionally in vesicular forms of the disease. Applied to a discharging surface, powders tend to form coherent crusts which retain secretions and are therefore irritating to the skin. In early stages, when the discharge is slight, powders will sometimes succeed in wholly arresting the secretion. For this purpose they are of special value in mild forms of intertrigo. To prevent friction of underwear upon the skin the meshes may be filled with a fine powder. In eczema of the hands the gloves may be treated in the same way. For absorptive purposes magnesium carbonate is effective. For use on dry surfaces zinc stearate, plain or combined with boric acid, salicylic acid, thiol, acetanilid, etc., is valuable on account of its lightness, and because it will adhere to any surface over which it is lightly rubbed with the hand. Among other excellent powders may be mentioned talcum, lycopodium, starch, rice-flour, bismuth subnitrate, zinc oxid, and calamin. The following formulæ are good:

R—Acid. boric.,	3ij;	8	M.
Talc.,	3vj;	24	
Ol. ros.,	q. s.	q. s.	
R—Acid. boric.,	3ij;	8	M.
Zinc. stearat.,	3ij;	8	
Talc.,	3ss;	16	
Ol. amygdal. amar.,	q. s.	q. s.	

Anderson's powder and others containing camphor relieve itching better than the simpler powders, but are usually too stimulating and irritating for use in acute cases. In the preparation of dusting-powders it is of the utmost importance that they be made impalpable by sifting them carefully through silk bolting-cloth, as they are sources of irritation when they contain gritty particles. Only the best and finest grades of zinc oxid, talcum, calamin, and other powders should be employed, as many of the coarser grades found in the market cannot be rendered fine enough for use by any means at the command of the average pharmacist.

Lotions.—Lotions are among the most valuable preparations in acute and subacute eczema, and in some of the chronic forms of the disease. They are especially useful in moist eczema, where it is necessary to protect the surface and relieve the itching, and at the same time to avoid the retention of secretions by the dressing. The chief drawback of the use of a lotion lies in the necessity of its frequent application to prevent drying. This objection may be removed partially by the addition of 2 per cent. or more of glycerin or of tragacanth-mucilage. The effect of a lotion is further prolonged by the addition of some impalpable and inert or astringent powder, such as talcum, zinc-oxid, bismuth-subnitrate, or calamin. The powder, temporarily held in suspension by shaking the lotion immediately before each application, is left as a deposit upon the skin. A similar but less uniformly diffused effect is produced by the use of a dusting-powder immediately after the application of the lotion. In moist eczemas a better method is to keep the lotion constantly applied, on gauze or other material, in the form of wet dressings. Great care must be exercised in the removal of such dressings after they have become dry, for fear of wounding the skin. An effective method is to put a single layer next the surface, which is removed but once or twice in twenty-four hours or only when soiled or stiffened by secretions, while a number of outer and thicker layers may be changed frequently in order to keep the dressing wet.

Lotions may be sedative, astringent, or stimulating. Many and varied formulæ are recommended, but a few only of the most useful and typical are given here, together with some suggestions as to their occasional modification. One of the most useful lotions, and one that is easily procured, is the following:

R—Phenolis,	℥ij;	2	66
Zinc. oxid.,	℥j;	4	
Glycerin.,	℥ij;	8	
Liq. calcis.,	q. s. ad. ℥viij;	q. s. ad. 240	M.

The quantity of any one or all of the first three ingredients may be increased or diminished as desired. When phenol does not act favorably, dilute hydrocyanic acid may be substituted. The zinc may be replaced partially or wholly by one of the other powders mentioned above. Glycerin is needed, where phenol is an ingredient, to

increase the solubility of the latter drug in the aqueous solution; otherwise tragacanth-mucilage may be used instead of glycerin, or both may be omitted and half of the lime-water be replaced by an equal quantity of elder-flower water. By the use of one or more of these suggested changes may be formed several compound zinc-oxid lotions; among the most desirable are:

R—Acid. hydrocyan. dil.,	℥ss-℥ij;	2-8	M.
Zinc. oxid.,	āā ℥j;	4	
Calamin.,			
Liq. calcis,	āā ℥iv;	120	
Aq. sambuci,			
R—Phenolis,	℥ss-℥ij;	2-8	M.
Bismuth. subnit.,	℥j;	4	
Tragacanth.,	gr. xl;	2	
Liq. calcis,	q. s. ad. ℥viiij;	q. s. ad. 240	
		66	

Occasionally, neither phenol nor hydrocyanic acid has the desired antipruritic effect, even when increased in strength to 5 per cent., or both may be contraindicated for some reason. In such cases from 1 to 3 per cent. of menthol, camphor, or chloral may be added, with sufficient alcohol to hold them in solution. With these additions, however, the lotion becomes more or less stimulating and must be used in acute cases with caution.

The lead-and-opium wash is as useful as the various zinc-oxid lotions, and in weeping cases, with burning or hyperesthesia, is usually more acceptable:

R—Tinctur. opii,	℥ss;	15	M.
Liquor plumbi. sub-			
acetat. dil.,	q. s. ad. ℥viiij;	q. s. ad. 240	

To this may be added, as in the case of the zinc-oxid lotion, glycerin, boric acid to saturation, zinc oxid, or other powder, to be left on the skin as a deposit; or from $\frac{1}{2}$ to 1 ounce (15. to 30.) of spirits of camphor, if this is well tolerated and a more decided antipruritic effect is desired.

A saturated solution of boric acid, to which has been added 2 per cent. or more of glycerin or tragacanth-mucilage, is an excellent application in moist eczema, and especially in suppurating forms. A weak solution of potassium permanganate is both antiseptic and antipruritic. Black wash, pure or diluted, is effectual in many moist forms of eczema, as are 1 to 10 per cent. solutions of ichthyol and thiol. Excellent lotions for soothing effect are made by adding 1 to 2 drachms (4.-8.) of sodium bicarbonate or baborate to a quart (1000.) of thin oatmeal-gruel or of marshmallow-decoction. For a dry, irritable, and itching eczema, Boeck recommends the following:

R—Talc.,			M.
Amyli.,	āā ℥ij;	60	
Glycerin.,	℥vj;	24	
Liq. plumb. subacetat. dil.,	℥iv;	120	

This is to be diluted with 2 parts of water, and applied with cotton or a brush. This lotion is decidedly cooling, but is not indicated in moist eczema.

Any one of the zinc-oxide lotions described above may be combined with an equal quantity of almond-, olive-, or other oil to form a liniment. These combinations are especially good on acutely inflamed surfaces of considerable extent, when it is desirable to avoid a drying effect. The popular carron oil, compounded of equal parts of linseed oil and lime-water, is often objectionable because of the tendency of the oil to dry and form a dense coating upon the skin to which it is applied.

For subacute and indolent stages of eczema and for some acute cases, mildly stimulating and stronger antipruritic lotions containing tar, phenol, menthol, camphor, chloral, and alcohol may be used. They should be tried cautiously and diluted at first. As a rule, they give best results when applied for a few moments several times a day, the part being kept covered in the interval with an ointment or other protective dressing. The following formulæ, which may be modified to suit individual cases, are to be recommended:

R—Phenolis,	℥jss—℥ss;	6-15	M.
Glycerin.,	℥ij;	8	
Menthol.,	℥j—℥ss;	4-15	
Alcohol's,	q. s.;		
Aq. dest.,	q. s. ad. ℥viij;	q. s. ad. 240	
R—Liq. picis alkalini,	℥ss—℥ij;	2-8	M.
Glycerin.,	℥ij;	8	
Aq. dest.,	q. s. ad. ℥viij;	q. s. ad. 240	

Liquor carbonis detergens, or Duhring's compound tincture of coal tar (these preparations are described under Chronic Eczema) may be substituted for the liquor picis alkalinus. Hutchinson recommends the following in dry, subacute eczema:

R—Liq. plumb. subacetat.,	℥ss;	2	M.
Liq. carb. detergentis,	℥ss;	2	
Aq. dest.,	q. s. ad. ℥viij;	q. s. ad. 240	

Ointments.—Ointments are not, as a rule, well tolerated by an acutely inflamed skin, and are commonly more useful in subacute and chronic eczema, but there are many exceptions to the rule, and occasionally even an acute vesicular eczema is best relieved by use of an ointment. These should be properly and freshly prepared, and the débris of one dressing should be carefully removed before another application is made. Strata of an ointment, the older next the skin possibly rancid and having imprisoned beneath them pus or other products of disease, are a source of positive harm. In acute, and especially in weeping, eczemas an ointment is best applied by spreading it evenly on gauze, lint, or other soft material, which can then be laid upon the

part. The *salve-muslins* devised by Unna furnish an excellent substitute for ointments; they are clean and effective, and in every way admirable if they can be procured fresh.

Among the best ointments for use on the acutely inflamed skin is one containing naftalan. It may be employed as follows: naftalan 50 parts, zinc oxid 25 parts, and amylum 25 parts; or the three ingredients, each 33 parts; or naftalan 25 parts, zinc oxid $12\frac{1}{2}$ parts, amylum $12\frac{1}{2}$ parts, and zinc oxid-ointment (U. S. P.) 50 parts. These combinations are especially valuable in weeping eczemas and are best applied on cloths or gauze and held in position with a bandage; the dressing being changed twice daily, and the parts cleansed at each change with olive oil or white vaselin. Another is the well-known diachylon ointment of Hebra. It is prepared as follows: To 14 ounces (420.) of the best olive-oil are added 1 pound (480.) of water, and the whole heated to boiling on a water-bath; 3 ounces and 6 drachms (114.) of finely powdered litharge (oxid of lead) are sifted slowly into the liquid, which is then boiled and stirred constantly until all particles of litharge have disappeared and there is formed a perfectly homogeneous mass. During the cooking, water is occasionally added as required, and the whole evaporated to the desired consistence. The stirring is to be continued until the ointment is cold. While the mass is cooling 1 drop of oil of roses or of oil of lavender is added to each 2 ounces of ointment. When properly prepared the Hebra ointment is perfectly homogeneous, is of a light-yellowish color, and is of the consistency of butter. It is technically known as the *unguentum diachyli albi* of Hebra.

The simple ointment often becomes rancid in two or three weeks, but it may be preserved for months by the addition of 0.5 per cent. of phenol or formalin.

Duhring has modified this ointment as follows: 1 part of pure dry lead oxid is rubbed down with 1 part of water, and well mixed with 8 parts of the best olive-oil. The mixture is stirred for about two hours over a water-bath near the boiling point, and is then cooled with constant stirring until the proper consistence is obtained. The ointment has been modified by Piffard also, and after him by Kaposi, in combining equal parts of lead-plaster and vaselin. It may be imitated fairly well by melting together 3 or 4 parts of olive-oil and 4 of diachylon plaster and stirring until cool.

The Hebra ointment, though useful often in full strength and even to the exclusion of other pomades, may often be combined with others with manifest advantage. Thus, 1 or 2 drachms (4.-8.) of it may be added to the ounce (30.) of lard, cold-cream salve, or cerate, with or without the addition of another drachm or two of zinc-oxid ointment.

The official zinc-oxid ointment is an acceptable preparation in many acute cases; equal parts of this and the Hebra ointment make an excellent combination. Any one of these ointments may be reduced with from one to three times its volume of lanolin, vaselin, or cold-cream

salve. The following formula gives an excellent soothing and protective ointment:

R—Bismuth. oxid.,	3j;	4	M.
Vaselin.,			
Ol. oliv.,	āā 3j;	30	
Ceræ alb.,	3iij;	12	
Ol. ros.,	q. s.		

Other bland and soothing ointments may be made by combining in various proportions cold-cream salve, lanolin, vaselin, lard, and simple cerate. The cerates are made sufficiently soft for gentle manipulation by adding 1 to 2 drachms (4–8.) of glycerin or oil to each ounce (30.) of ointment, and they may be flavored with lavender, rosemary, or bergamot, as preferred. These simple bases may be stiffened and rendered somewhat astringent by the addition of from 10 grains to a drachm (0.66–4.) or more of bismuth subnitrate or subcarbonate, zinc oxid, or calamin to the ounce (30.). A very thin base may be prepared by mixing equal parts of lanolin, olive-oil, and glycerin. This is especially valuable for use on hairy surfaces. A creamy and cooling base is Unna's "refrignent ointment," which contains lanolin, 10; lard 20; and rose-water, from 30 to 60 parts. Any of the above bases may be medicated as desired; the most frequent addition being from 5 to 10 grains (0.33–0.66) of phenol, boric, or salicylic acid, or a similar quantity of calomel or white precipitate to the ounce (30.) of salve. With these unguents may be named glycerole of starch, cucumber ointment, emulsion of sweet almonds, decoction of Irish moss, and Hardy's formula: 2 parts of zinc oxid, 8 of glycerin, 30 of cold-cream salve, and 15 drops of tincture of benzoin.

The oleate of bismuth or of zinc is prepared by rubbing up 1 drachm (4.) of the oxid of either metal with 8 drachms (30.) of oleic acid, and allowing the mixture to stand for two hours. It is afterward heated on a water-bath, when 10 drachms (40.) of vaselin and 3 (12.) of wax are dissolved in it, and the whole stirred until cold. This ointment is especially useful when employed in papular forms of eczema. In pustular eczema ointments containing iodoform, boric acid, iodol, aristol, or euophen are indicated.

The Combined Use of Lotions and Ointments will often give good results. The black wash as recommended by Duhring, White, and others is often effective in acute vesicular eczema. The part is bathed for fifteen or twenty minutes two or three times a day with the wash, the sediment allowed to remain on the skin, and the whole covered with a piece of gauze or soft cloth, on which has been spread a thick layer of zinc-oxid or other simple ointment. The lead-water or the zinc-oxid lotions may be used in the same way with simple ointments or pastes.

Pastes.—Pastes are especially valuable in subacute eczema, and are often tolerated in acute forms better than an ointment. A thick paste is rarely indicated in moist eczema, as it prevents escape of the discharge from the surface. Pastes are more cleanly and adhesive, fur-

nish better protection, are more drying, and require less frequent application than ointments. They are formed by combining a simple powder, usually insoluble, with an ointment-base, the proportions of the two being so adjusted as to produce a more or less stiff, somewhat tenacious mixture, which may be spread as a protective covering directly upon the skin. The following paste, recommended by Lassar, may be taken as a type:

R—Amyl.,	℥ij;	8	M.
Zinc. oxid.,	℥ij;	8	
Vaselin.,	℥ss;	15	

The substitution of talc for the starch in the above gives a paste with less tendency to concrete in lumps on the skin. Boric acid used in place of the starch produces a stiff and adherent paste. A very smooth and pleasant combination, and one that is also fairly stiff and adherent, is made of equal parts of talc, zinc-oxid, vaselin, and lanolin. These pastes serve as bases to which various medicaments may be added. Those most commonly used in acute and subacute eczema contain boric and salicylic acids and phenol in the strength of from 1 to 5 per cent.; calomel, white precipitate, ichthyol, and thiol in similar proportions. Other remedies may be employed according to the indications. The following is an adherent and drying paste:

R—Lanolin.,	℥ij;	60	M.
Paraffin.,	℥j;	30	
Ceræ alb.,	℥j;	4	
Aq. dest.,	℥j;	30	

The lanolin, paraffin, and wax are thoroughly mixed before the water is added. A good drying and soothing paste, recommended by Morris, is made of equal parts of almond- or olive-oil, lime-water, and zinc-oxid. Unna recommends a paste prepared by mixing 1 ounce (30.) of zinc-oxid with 2 ounces (60.) each of glycerin and an official mucilage. To either of these pastes may be added 1 per cent. of phenol or salicylic acid. Another good base is found in Elliot's bassorin-paste,¹ which is described in the chapter on General Therapeutics.

Glycogelatins.—These render excellent service in all dry forms of eczema, in which merely protection is required. Certain remedies may also be incorporated, such as 1 or 2 per cent. of ichthyol or thiol. A convenient formula is the following:

R—Gelatin. alb.,	aa	℥j;	30	M.
Zinc. oxid.,		℥jss;	45	
Glycerin.,		℥ij;	90	
Aq. dest.,				
R—Gelatin. alb.,		℥ijss;	10	M.
Zinc. oxid.,		℥v;	20	
Glycerin.,		℥j;	30	
Aq. dest.,		℥x;	40	

¹ Jour. Cut. Dis., 1891, ix, p. 48, and 1892, x, p. 184.

The ingredients are mixed on a hot water-bath and when cool and solidified may be cut in pieces of convenient size for use. Before application a sufficient quantity is melted in a dish placed in a receptacle containing water, which is heated to a suitable degree; the liquefied material is then applied with a brush, care being taken that it is not uncomfortably hot for the patient. It dries somewhat slowly, and it is well after two or three minutes to pat the surface with cotton or to cover it completely with gauze. By increasing the quantity of glycerin a softer and more slowly drying preparation is formed. By lessening the quantity of glycerin and increasing that of the zinc-oxid or gelatin, a firmer and more rapidly drying product is obtained. Though these glycogelatins serve their best purpose in the dry forms of the disease, there are few forms of eczema in which they may not at times be used with benefit.

In subacute and indolent types Pick's *Gelatin Sublimate* is useful. This is prepared by mixing 30 grammes (℥j) of gelatin with sufficient water to liquefy it on a water-bath, and evaporating to 75 grammes (℥ijss); after which 25 grammes (℥vj) of glycerin and 5 centigrammes (gr. $\frac{5}{8}$) of corrosive sublimate are added. The product must be melted before applying.

In acute erythematous eczema Pick's *Tragacanth Varnish* ("*linimentum exsiccans*") is a very acceptable remedy, in that it is easily applied without heating, dries quickly, is cleanly, and distinctly cooling. It is composed of tragacanth, 5 parts; glycerin, 2 parts; and boiling water, 93 parts. To this may be added from $\frac{1}{2}$ to 2 per cent. of boric acid or phenol, or from 2 to 5 per cent. of some simple powder, such as zinc-oxid. The tragacanth must be soaked for several hours in a part of the water and thoroughly triturated before the other ingredients are added. Stelwagon¹ prefers a varnish containing zinc oxid, 2 parts; glycerin, 1 part; and mucilage of acacia, 5 to 8 parts, as it dries more quickly than the tragacanth.

2. SUBACUTE ECZEMA.—Attention has already been called to the fact that no sharp line can be drawn between acute, subacute, and chronic eczema, the degree of inflammation in any given case varying from time to time. Most acute cases, however, are followed by a longer or shorter period of subacute or chronic inflammation. In proportion as the disease progresses to the subacute or chronic stage, the various topical medicaments employed may be changed in character so as to produce an astringent or stimulating effect upon the part. The utmost skill and prudence, however, are needed at this juncture, and changes should be made cautiously, for it is at this time that the disorder is readily awakened to renewed activity, a turn of affairs which is especially annoying to the patient, and particularly so to the practitioner if there be a suspicion (often too well founded) that the aggravation has been due to the treatment.

Again, many cases of eczema are subacute and indolent from the

¹ Diseases of the Skin, 7th ed., p. 311.

beginning, yet are liable at any time to present acute manifestations; consequently, in beginning the treatment of an apparently subacute case, it is well to use mild measures first, gradually changing to those stronger and more stimulating.

The treatment of subacute eczema varies from that of the acute type chiefly in demanding more stimulating remedies and those having a greater antipruritic effect. For this purpose many of the substances already recommended for acute eczema may be employed, but in increased strength. In this phase of the disorder pastes are especially valuable, as are also the glycogelatins, though occasionally lotions and powders produce the best results. On the other hand, cases occur in which ointments make the best applications. When milder measures will not succeed in a given case, the stronger remedies recommended for chronic eczema should be employed.

3. CHRONIC ECZEMA.—The general principles of local treatment of chronic eczema are those of the acute form of the disease, except that stronger and more stimulating remedies are used. It must be remembered that many chronic eczemas are subject to acute exacerbations, when milder and soothing treatment must be adopted for a time. Moreover, chronic eczema appears in such varied phases in different individuals, and in the same individual in successive attacks, that it is impossible to select certain formulæ and declare that these will be of benefit in a given type of the disease. It is only by careful observation of the general principles and objects of the treatment of eczema, discussed in the preceding pages, that the varied conditions can be successfully treated.

Cleansing of the Skin.—This should be accomplished according to directions already given, by means of oils or liniments, though in chronic eczema more vigorous measures can frequently be employed, including the occasional use of soap and water, some densely infiltrated patches tolerating and even being benefited by a daily washing. For this purpose a good toilet-soap, or, when the skin will permit, tincture of green soap, may be used. The Sarg glycerin soap is an admirable substitute for these articles when the skin is tender and where a refined toilet-preparation can be ordered. The crusts and scales once removed, subsequent topical applications can be made as required in each case.

Powders.—Powders are useful in chronic as in acute eczema for mechanical protection, to prevent friction between apposed skin-surfaces or between the skin and clothing. They are often of value when dusted and patted over a paste, thus making a thicker and more cleanly dressing, and one less likely than a paste to be rubbed off. The Anderson and other antipruritic powders are frequently serviceable for application during the day, when other dressings cannot well be employed on account of the patient's occupation.

Lotions.—Lotions are of less value in chronic than in acute eczema, but are often useful for temporary purposes after the skin has been unduly irritated by other dressings. Stimulating lotions or solutions

are sometimes painted on the skin and allowed to dry, or are used for a few minutes each day, the surface in the intervals being covered with an ointment.

Ointments.—Ointments are the preparations most used, especially in the dry, scaling forms of the disease, in which penetration of the remedy is desired. To serve this end, they should be gently rubbed into the surface, which is later covered with more of the same ointment spread on gauze or a soft cloth.

Pastes.—Pastes often answer better than ointments, especially when protection and drying of the surface are the chief objects of treatment. In combination with powders, as described above, they furnish convenient and effective applications in most cases of chronic eczema. In many dry forms of the disease either plain or medicated glycoelastins furnish the best application. They are of special value in dispensary and other cases in which the physician does not wish to entrust the dressing to the patient, as a gelatin-dressing may often be left in place for several days or a week. For the application of tar, chrysarobin, salicylic acid, and a few other remedies to small areas, collodion and fluid gutta-percha (traumaticin) form convenient and cleanly vehicles.

Applications in chronic eczema, as a rule, should be more antipruritic and more stimulating than in acute and subacute phases of the disease. The remedies recommended above may be used in increased strength. This is especially true of the drugs classed as antipruritics, such as phenol, creosote, camphor, menthol, and chloral.

Salicylic acid is one of the most useful remedies in chronic eczema. It is antipruritic and is effective in destroying thickened areas of dry, horny epidermis. It may be incorporated, in the strength of from 2 to 10 or even 20 per cent., in most of the ointments, pastes, and plasters recommended in the preceding pages. In the glycoelastins more than 2 or 3 per cent. cannot be used without the addition of a fat, preferably 5 per cent. of fresh lard. For small areas of infiltration, with marked thickening of the horny layer, salicylic acid is best used with Duhring's modifications of Pick's *salicylated soap plaster*. The acid has a tendency to soften the plaster if employed in strength above 5 per cent. The formulæ are as follows:

R—Emplast. saponis (U. S. P.)			
liquefact.,	℥iij;	90	
Ol. olivæ opt.,	f℥ij;	8	
Acid. salicylici,	℥ss;	2	M.

For a 5 per cent. plaster:

R—Emplast. saponis (U. S. P.)			
liquefact.,	℥j;	30	
Ol. olivæ,	℥xxiv;	1	60
Acid. salicylici,	gr. xxiv;	1	60 M.

For a 10 per cent. plaster:

R—Emplast. saponis (U. S. P.)			
liquefact.,	℥j;	30	
Acid. salicylici,	gr. xlv;	3	M.

For a 20 per cent. plaster:

R—Emplast. plumbi (U. S. P.),	℥j;	30	M.
Ceræ flavæ,	gr. xlv;	3	
Acid. salicylici,	gr. xc;	6	

Plasters made according to the above formulæ are adhesive, and are firm enough to be moulded and kept in rolls. For large surfaces they should be warmed before being applied, to make them spread easily. Resorcin and other remedies may be substituted for salicylic acid, but resorcin has a tendency to stiffen the plaster and requires the addition of oil. Unna's salicylated gutta-percha plaster-mulls make excellent substitutes for the above, but to be serviceable they should always be fresh.

Tar.—This is one of the most valuable remedies, when tolerated by the skin, for the treatment of chronic eczema. The preparations most commonly employed are *pix liquida* (pine-tar), *oleum rusci* (oil of white birch), *oleum cadinum* (oil of cade), and *terebinthina Canadensis* (balsam of fir). Oil of cade, as found in most of the shops, is inferior to *oleum rusci*. The tars are best applied in the form of ointments, but are occasionally painted with a camel's-hair brush over the affected surface in a liquid state. From $\frac{1}{2}$ to 2 drachms (2–8.) of tar, in combination with a suitable quantity of potassium subcarbonate, are sufficient to add to 1 ounce (30.) of ointment, the proportions suggested being varied to suit the requirements of each case.

In beginning the use of tar with any individual, weak preparations should first be employed, and the strength be gradually increased until tolerance of the skin is determined, as an acute dermatitis not infrequently follows the application of stronger preparations. A convenient method is to order one jar of a fairly strong tar-ointment, and another of the zinc-oxid, the Hebra, or other simple salve. Before the first application the patient takes a sufficient quantity of the simple ointment and mixes with it a very small proportion of the tarry preparation. If no irritation follows this application, the amount of tar can be gradually increased with each dressing until enough is used to relieve the itching and to reduce the infiltration, after which a simple paste or powder may be employed until the skin has regained its normal strength and resistance. If the application at any time causes an acute dermatitis, simpler remedies for a time must be substituted. To accomplish the best results, tar-ointments should be rubbed well into the skin or liquid preparations painted on. Sometimes it is well to permit the application to accumulate until thrown off by exfoliation, but it is better to cleanse the skin with oil or with soap and water, according to indications, before each application.

The following formulæ are illustrations of the manner of compounding the various preparations of tar:

R—Ol. rusci (vel cadini),	℥ss–℥iij;	2–12	M.
Potass. bicarbonat.,	℥j–℥ss;	1.33–2	
Unguent. aq. ros.,	℥j;	30	
Ft. ungt.			

For the potassium bicarbonate $\frac{1}{2}$ to 1 drachm (2–4.) of zinc-oxid may be substituted, or from 2 to 4 grains (0.133–0.266) of red mercuric oxid, or yet $\frac{1}{2}$ scruple (0.66) of mild chlorid. The vehicle, also, of such ointments may be vaselin, lanolin, simple cerate, or $\frac{1}{2}$ ounce (15.) of either in combination with an equal quantity of diachylon ointment.

Of fluid preparations may be mentioned alcoholic solutions of tar, $\frac{1}{2}$ ounce (15.) of the latter to the pint (500.) of alcohol; and in cases in which the deterative action of soap is also needed *sapo viridis* may be added as follows:

R—Pis liquidæ,	f ʒj–ʒij;	30–60	M.
Saponis mollis,	f ʒjss–ʒij;	45–90	
Glycerin.,	f ʒj;	30	
Alcoholis.,	f ʒvii;	240	
Ol. rosmarin.,	f ʒss;	2	

Sig.—To be rubbed gently into the skin with a flannel rag.

Bulkley devised an alkaline solution of tar and caustic potash, which is especially serviceable, as it is miscible with water in all proportions. It is constituted as follows:

R—Pis liquidæ,	f ʒij;	60	M.
Potasse causticæ,	ʒj;	30	
Aq. dest.,	ʒv;	150	

Dissolve the potash in the water, and add slowly to the tar in a mortar with friction.

Sig.—*Liquor picis alkalinus*. To be used diluted as a lotion.

Of this solution 1 drachm (4.) or more may be added to a pint (500.) of water. For an ointment, the same quantity of the solution may be added to the ounce (30.) of cold-cream salve, lanolin, or vaselin. It should be remembered, however, that the caustic alkali renders this preparation exceedingly irritating to a sensitive skin, and it should be employed with caution upon any untested surface.

An excellent fluid preparation is Duhring's *Compound Tincture of Coal-tar*, prepared according to the following formula: "Coal-tar (1 part) should be digested with tincture of quillaja (6 parts), with frequent agitation, for not less than eight days, preferably for a longer period, and finally filtered. The resultant product is a brown-black tincture, which, upon the addition of water, forms a cleanly, yellowish emulsion, the color and certain other characters varying with the variety of coal-tar used. The strength of the tincture of quillaja should be 1 to 4 with 95 per cent. alcohol." Five to 15 minims to the ounce (0.33–1. to 30.) of water is the strength recommended for use.

The formula recommended by Spencer, and described in the chapter on General Therapeutics, is a useful means of testing the efficacy of tar upon an eczematous surface. Olive-oil or cod-liver oil may be combined with equal parts of one of the tarry preparations and rubbed into the eczematous skin. When fluid or semifluid compounds of tar are needed upon the scalp, 1 drachm (4.) of the article selected may

be rubbed up with an equal quantity of glycerin and added to 6 ounces (180.) of cologne-water. Creolin is very similar in its action to tar and is miscible with water.

Hebra disclaimed any special value for sulphur in eczemas uncomplicated by the *Acarus scabiei*, but in Wilkinson's and other ointments it serves a good purpose. The following formula supplies an ointment rather less severe than has practical efficacy in chronic eczema:

R—Picis liquid. (vel. ol. rusci),	℥iv;	120	
Adipis,	℥j;	30	
Ol. olivæ,	℥ss;	15	
Misce et adde:			
Terebinth. Canadens.,			
Sulphur. flor.,	āā ℥j;	āā 30	M.
Sig.—To be applied three times daily with a soft brush.			

To this formula may be added green soap, if a stronger effect is desired.

*Crude coal-tar*¹ is a valuable preparation in chronic eczema. It has been useful also in some cases of the acute type. Ointments and pastes containing 10 to 30 grains (0.66–2.) of sulphur, and 5 to 15 grains (0.33–1.) of salicylic acid to the ounce (30.) often give good results in circumscribed, infiltrated patches of eczema, which show tendencies to occasional moisture and crusting. Ointments containing from 1 to 4 per cent. of sulphur favor keratoplasia.

Ichthyol and thiol, in ointments of the strength of 10 per cent. and less, or in aqueous lotions containing from 5 to 50 per cent. of the drug, are useful in localized patches of the disease, especially of the papular and scaling varieties. Ammonium ichthyolsulphonate is preferable to the sodium compound. Its influence upon the skin seems to resemble both that of the tars and of chrysarobin. Unna's varnish containing ichthyol is convenient, as it dries rapidly and is easily removed by washing. It is prepared as follows: 40 parts of starch are mixed with 100 parts of water, to which are added 40 parts of ichthyol; after thorough trituration there are added 1½ parts of a concentrated solution of albumin, which should be prepared at a temperature low enough to prevent coagulation.

Other remedies which may be added to ointments, pastes, or plasters (in strength varying from 1 to 10 per cent.) for the treatment of chronic eczema are: resorcin, chrysarobin, pyrogallol, calomel, and ammoniated mercury. Occasionally, systemic intoxication has followed the use of these remedies over large surfaces, and they are adapted best to employment on small areas. The three first named stain the skin and clothing. Other preparations of mercury may be employed with advantage in some cases.

In persistent areas, with marked infiltration of the skin, radiotherapy often gives excellent results. We have found it of value most frequently in the dry, scaling forms of the disease, but it is indicated also

¹ Sutton, Jour. Amer. Med. Assoc., August 8, 1908, p. 497; Rygier and Miller, Archiv, October, 1912 (abstr. Brit. Jour. Derm., 1913, vol. xxv, p. 73).

in moist forms with infiltration, and especially in cases in which supuration is present. The technique is the same as that recommended for psoriasis.

An effective method of treating circumscribed thickened patches of eczema is the following: A piece of green soap as large as a walnut is spread upon a flannel rag and rubbed into the eczematous part for several minutes, pressing firmly the while, and from time to time dipping it into water in order to produce lather. The duration and firmness of the rubbing depend chiefly upon the amount of infiltration present, but to some extent upon the general condition of the skin. The production of an acute dermatitis by too severe treatment should be avoided. Following the soap-rubbing, the part is washed free from suds with water, carefully dried, and the oil or ointment selected for topical use immediately applied on strips of muslin, which are neatly bandaged to the part. Hebra's diachylon ointment is one of the best for this purpose. The soap must be rubbed in at least twice every day, so long as any excoriated points appear after its application. Soap rubbed into the healthy skin will not be followed by such effects, the part feeling clean, smooth, and comfortable after it has been washed. The contrast this offers to the eczematous patch is very striking, the latter representing numerous intensely red, raw, and moist spots. The appearance of these red, shining, moist points after the first inunction suggests to the inexperienced eye that the malady has been aggravated; but they become fewer in number after each application, and finally disappear, the eczematous surface being then no more affected by the soft soap than is the surrounding healthy skin.

Among the more severe measures occasionally employed for small patches of eczema which resist milder treatment may be named: cantharides employed as a blister; silver nitrate in crayon or in solution, from 3 to 60 grains to the ounce (0.2-4. to 30.); and iodine in combination with phenol. The following formula should furnish a clear, vinous-red fluid, which may be applied pure or in dilution:

R—	Iodin. tinct.,	℥ss;	2		M.
	Phenolis (cryst.),	℥j;	4		
	Glycerin.,				
	Alcoholis,	āā ℥ij;	āā 8		
	Aq. dest.,	ad f℥j;	ad 30		

Sig.—Iodized solution of phenol.

In cases in which there is considerable itching, especially in obstinate patches of papular eczema, the iodized phenol of Bellamy may be substituted for the above. The formula is:

R—Phenolis,			
Iodini cryst.,	āā 3j;	āā 4	
Combine with gentle heat and add an equal part of glycerin.			
Sig.—Iodized phenol; to be applied twice daily with a glass rod.			

Prognosis.—Eczema is an entirely curable disease, but uncertainty attends its prognosis as regards the duration of an attack and the prob-

ability of a relapse. With respect to the questions most frequently asked, those relating to contagion, heredity, and persistent lesion-relics, a favorable response can be made; but the fact remains that some forms of the disease are insignificant, some persistent, and some particularly liable to recurrence from very slight provocation. Only after careful weighing of all the conditions exhibited by the skin and by the other organs can a reasonable probability as to the future of the disease be estimated. Eczema is a disease exceedingly common, and one subject to aggravation by causes well-nigh innumerable. Were the physician always in position absolutely to insure his patient a proper mode of living, and the exclusion of all sources of irritation of the skin, the prognosis would be much more satisfactory. In hospital-patients, over whom such control is more perfectly attained, the results of treatment may be predicted with some confidence.

In general, it may be said that acute eczema is more readily relieved by proper treatment than are the chronic forms of the disease; that eczema with a discoverable cause is more manageable than one the etiology of which is obscure; that eczema of the very young and of the very old is at times particularly rebellious; that the non-discharging phases of the disease are rather more persistent than those accompanied by secretion; that eczema lingering at the mucous outlets of the body (auditory canal, nostrils, mouth, nipple, anus, vagina) is more obstinate than when it affects the skin of other parts (shoulders, neck, lumbar region); that eczema with constant aggravation or complications (fissure of skin of hand, varicose veins of leg, surgical apparatus) is more stubborn in proportion as these complications or aggravations cannot, from the circumstances of each case, be set aside; and, finally, that an eczema which has long existed, or has repeatedly recurred, as, for example, with every season of extremely cold or hot weather, is, after relief, very liable to return. The parasitic eczemas are particularly amenable to treatment.

TOPICAL AND SPECIAL VARIETIES OF ECZEMA.

Eczema of Children.—Inflammation of the skin in infants and young children is usually acute in type, owing to the delicate structure of the skin and to the tendency in childhood to acute rather than subacute and chronic pathological changes in the various organs of the body; consequently, the eczema of infants is commonly vesicular, pustular, or vesiculo-pustular in expression. Though acute in type, eczema of young children is frequently chronic in duration; a child, for example, of two, three, or four years of age may have had the disease in varying degrees and extent since a few weeks after its birth. In these persistent cases there may be considerable thickening and infiltration of the skin, and periods during which the symptoms are those of a subacute or chronic process; but acute manifestations recur at frequent intervals and usually predominate.

The causes peculiar to eczema of childhood are found in the ease and

frequency with which the delicate skin is injured by external agents,¹ such as soap, hard water, rough clothing, dirt, and pathological secretions, together with the rubbing and scratching that follow itching from any cause; in the presence of toxins in the blood, resulting from deficient elimination or from imperfect metabolism and assimilation of food, due commonly to improper or irregular feeding, and from various systemic diseases; in the so-called reflex irritation arising from dentition; and in the local infections of the skin with pus-cocci and probably at times with other microorganisms. According to statistics gathered by Crocker, more than one-third of all cases of eczema in children begin during the first year of life.

Treatment.²—Success in the treatment of these young patients depends, first, upon the painstaking search for, and removal of, the causes; and, secondly, upon the care with which the principles of treatment of acute eczema, already set forth, are carried out in all details. Special attention should be given the question of diet, and every effort should be made to prevent autointoxication of intestinal origin. In the local treatment gentle measures should be the rule.

Eczema of the Scalp (*Eczema Capitis*, *Eczema Capilliti*).—**Symptoms.**—When the scalp is affected with eczema the symptoms differ somewhat according to the age of the patient. In adults the erythematous and squamous varieties of the disease are more common; in infants and children the pustular variety. In the former the eruption is usually circumscribed and in patches; in the latter it is more diffused. In the same proportion, also, the former is generally asymmetrically, and the latter symmetrically, developed.

In infants and children the pustules rupture early and their contents dry into dirty-whitish, yellowish or greenish crusts, matting the hairs, thus serving as foci for dust-accumulation and as nests for lice. The crusts superimposed upon a reddish, oozing, pus-covered, or occasionally indolent skin, often foul-smelling, and usually complicated by a seborrhea. The so-called "milk-crust" is usually a compound of dried pus and altered sebum. The itching is not so intense as in some other forms of the disease. Postcervical, pre-auricular, and occipital adenopathy is common, and in strumous children suppuration of the affected glands may occur. The causes of this form of disease are evidently associated with local conditions. The rapidly growing hairs of the scalp are in intimate association with the numerous and large sebaceous glands of the same part, which at times unquestionably respond by an exudative process when a relatively slight external irritation is added to the physiological stimulus they feel. Such local irritants are often not wanting to push the disturbed equilibrium into the scale of disease. White calls attention to the common neglect in removing the "pre-natal cap of cheesy material," as well as to rude and unskillful attempts to accomplish the same end. Extremes of tem-

¹ Hall, Brit. Jour. Derm., 1905, xvii, pp. 161, 203, 247 and 287, and *ibid.*, 1908, xx, p. 4.

² Winfield, Jour. Amer. Med. Assoc., 1908, l, p. 1993; Simpson, *ibid.*, 1912, lviii, p. 995.

perature, friction, excess, neglect, and absence of endeavor to wash the scalp all contribute to originate or to aggravate the disorder.

The affection when complicated or induced by lice is more common in children than in infants, doubtless in consequence of the greater independence of the former and their gregarious habits. In girls with relatively long hair, the ova, or nits, of the parasite are readily distinguished adhering closely to the hairs, and accumulated especially about the occipital region. The itching is usually more annoying than in pustular eczema not thus complicated.

The erythematous and squamous forms of the disease, rather more common in adults, originate frequently in seborrhea when scratching has been practised or irritant applications have been made. The eruption here usually occurs in asymmetrical patches, or it may be limited to a single patch, tolerably well defined in outline, often upon one side of the scalp, not, as in infancy, preferring the vertex.

Diagnosis.—The diagnosis of these forms of disease has been already considered. The disorders most commonly confused with eczema of the scalp are psoriasis, dermatitis seborrheica, favus, and trichophytosis capitis.

Treatment.—In the treatment of eczema of the scalp in infants and children the first indication to be met is the removal of the accumulated crusts. When this removal is harshly accomplished, it becomes a fruitful source of further mischief; it is therefore necessary to proceed with great gentleness. The thorough softening of the crusts is all-important. For this purpose it is necessary to soak them with oil and to retain this substance in intimate contact with the scalp. Olive- or cod-liver oil may be selected, and, if needful to correct the odor or for other purposes, 1 drachm (4.) of phenol may be added to each pint (500.), with 2 drachms (8.) of the balsam of Peru. A neat-fitting skull-cap, constructed of suitable impervious material, should then be applied smoothly, and fastened in place by a light bandage, never by elastic-rubber bands. After several hours of soaking the crusts should be removed with warm water and spirit-of-soap washing, and the entire process be repeated until the crusts are completely detached. In selecting an article for subsequent medication of the scalp, it should be remembered that even infantile eczema will proceed to a natural involution if unirritated; hence, oleated lime-water, or oil of sweet almonds alone will often answer better than an ointment, and, even where there is considerable acuity of the inflammatory process, lime-water alone, with possibly a small quantity of glycerin added, will be effective. As the discharge and crusting cease, ointments instead of oils and lotions may be employed. The ointment is to be rubbed gently over the surface with the tip of the finger, and the skin afterward protected with suitable dressing, such as a gauze-cap. Good ointment-bases for use on the scalp are lanolin, vaselin, equal parts of lanolin and oil, or equal parts of glycerin, lanolin, and oil. The following remedies may be incorporated in strength varying from 1 to 5 per cent.: phenol, salicylic and boric acids; calomel, ammoniated

mercury, ichthyol, sulphur, resorcin, and tar. In children and in acute cases strong preparations must not be used. When the seborrheal element is at all pronounced the treatment is that of seborrheal dermatitis.

It is rarely needful to cut the hair unless nits be found, though in public charities it is a more expeditious method of arriving at the end, when a nurse has to dress the heads of several children in a single ward. Lice when present may be destroyed by the application of petroleum, bichlorid lotions, or alcohol. The nits are removed with dilute acetic acid, alcohol, or cologne-water from hairs which it is not desirable to cut. In adults, especially in women, the hair should be spared, while the patient is warned that the loss of the growth upon the scalp may be considerable. Where an obstinate pityriasis steatoides is followed by eczema, the latter may be succeeded by alopecia; in the absence of the former the hairs usually are reproduced. It is rarely necessary to employ the skull-cap in adults, since one can succeed in insuring the necessary applications by directing the attention of the patient to the necessity for care and thoroughness.

As the disease in both classes of patients advances to a subacute or chronic stage the treatment may be made more stimulating. In the case of infants, however, stimulating topical remedies are very rarely to be employed. An eczema of the scalp in an infant or a child that has once entered upon resolution should generally be soothed and protected.

Many children thus affected are in excellent general health, and require no internal medication. Proper nourishment, elimination, and hygienic surroundings should be sought in every case.

The treatment of erythematous and chronic eczema of the scalp in adults is described under Dermatitis Seborrheica.

Eczema of the Face (*Eczema Faciei*).—**Symptoms.**—Erythematous eczema of the face in adults is projected prominently among the varieties of the disease by its uniformity of type. It occurs in early and middle life and in advanced years, and is a particularly intractable ailment. In well-marked cases the forehead, cheeks, eyelids, and nose of the patient are involved, exhibiting an infiltrated, usually dusky-red, often symmetrical, patch of disease, the affected surface being slightly elevated above the level of sound skin. This surface is uniformly smooth and reddened; occasionally, near the root of the nose and about the lower line of the forehead, minute, closely-set papules are visible. Very slight oozing, especially after irritation, may be noticed. At the height of the disease, or in its involution, exceedingly fine scales form, which are scarcely perceptibly shed from the surface. The eyelids, especially the lower lids in advanced years, become puffy. The line of demarcation of the attacked surface is unusually distinct, and rarely invades the scalp-border or the region of the beard. Itching is at times intense, the patient bitterly complaining of it, and usually preferring to rub the face with the hands or with pieces of cloth. Sometimes, however, the face is well scratched

with the finger-nails, and excoriations and blood-crusts disfigure the countenance. Patients of intelligence usually describe the itching as paroxysmal and as starting at the root of the nose, whence it travels upward over the forehead and laterally to the brows, often in the line of the supraorbital nerves. At the root of the nose the exudative process is most marked. The eruption is seen also in asymmetrically disposed patches of various sizes, with islets of sound skin between. In typical cases the hairs of the eyebrow are reduced to a stubble by constant rubbing. In resolution of the symmetrical form this condition of the eyebrows is commonly observed.

Patients thus affected are often those whose faces have especially been exposed to irritation, such as locomotive-engineers, pilots of sea-going vessels, mechanics in trades in which the hands are soiled with irritants and afterward applied to the face, and women spending hours of each day over the laundry-tub or the kitchen stove. In each class the operation of the cause is made manifest by the exacerbation of the disease after exposure.

In patients of younger years and especially in infants the face is apt to display vesicular and pustular types of the disease, forms more often of acute eczema, and correspondingly more manageable.

The itching, and especially the burning, sensations are prone to be severe, and crusts rapidly form. In infants the picture presented is often similar to that seen in the scalp, except that there are no hairs to be matted into crusts and there is often a reddish blush at the edge of the patch or where the crust has been removed, the redness of the oozing surface being somewhat more marked than in the similar patches on the less vascular scalp. The scratching in these patients is severe, crusts being torn off in part or wholly; blood-crusted excoriations are common. In this way the area of surface involved is clearly extended, sleep is greatly disturbed, and the irritability and fretfulness of the child bear heavily upon its general nutrition. In severe cases of long standing the mental tone of these sufferers becomes singularly perverted and their character unquestionably changed. The eczema of the cheeks and chin of infants appears at times to stand in close relation to the eruption of the teeth. Hall¹ found that in 96 per cent. of infantile eczemas the face and scalp were the points of origin.

Diagnosis and Treatment in Adults.—The affection is most commonly mistaken for erysipelas, a disorder from which it is readily differentiated by the chronicity of its course. The latter feature is particularly characteristic of this form of eczema, which is rarely completely relieved, after the age of sixty, within a twelvemonth, and which, when it has existed for a long period of time, is particularly obstinate under the best treatment, recurring with exasperating frequency upon exposure of the face to atmospheric changes. The great vascularity, abundant supply of sensory nerves, and necessary exposure of the face explain this peculiarity. In its management the lotions and dusting-

¹ Loc cit.

powders described under the treatment of acute eczema fulfill an important part. In some cases pastes, ointments, plasters, or the glycoelatin give better results than lotions and powders. Soothing applications should always be first employed; and more stimulating applications may be tried later. In many cases Pick's *linimentum exsiccans* or tragacanth-glycerin mucilage furnishes a pleasant and effective application.

In obstinate cases tar and other stimulating remedies recommended for chronic eczema should be employed. It is well to remember in the management of any case that, while a tarry application may be well tolerated over one part, as, for example, on the cheeks and near the nose, in another part, such as over the eyelids, a zinc-salve may better be employed in the same individual.

Treatment in Infants.—In the management of infantile eczema of the face, the points of importance are avoidance of all external irritating applications, including soap and water; the removal of crusts and débris with olive or other oil or white vaselin; and the application of soothing preparations held in position with a mask. The dressings are best retained in position by using a skull-cap, made of firm, old cotton or linen cloth, which is closely fitted to the calvaria, and a mask of the same material is shaped to the face, with exactly placed apertures for the eyes, nose, mouth, and ears. This mask is gathered in beneath the chin, and laps over two inches at the back of the head; it may be used only during sleep, or, in aggravated cases, also during the day.

The lotions, oils, or ointments required are placed on pieces of soft cloth, applied to the face, and the above described device used to hold them in place. To prevent scratching of the face, splints should be applied extending from the middle of the forearm to the middle of the arm on the flexor surface. The application of most value in these cases is naftalan, used as before mentioned in acute eczema. The zinc-oxid and lime-water lotion or the calamine lotion are valuable, also the following oily cream: zinc oxid 8 parts, bismuth subnitrate 4 parts, olive oil 120 parts, and aqua calcis 120 parts, in addition the black-wash and zinc-salve treatment, the diachylon salve, Lassar paste, boric-acid ointment, lead lotions, glycerole of starch, and other preparations and methods described in full in the treatment of acute eczema. These cases are often very capricious in their course, and treatment may have to be changed frequently to meet the varying conditions.

Eczema of the Lips (*Eczema Labiorum*).—Reference has already been made to the obstinacy of eczema occurring near the mucous outlets of the body, a result due, probably, to the secretion furnished by the adjacent mucous tracts. The lips furnish an illustration alike of this pertinacity and aggravation. Their frequent motions in mastication and articulation aggravate an eczema, which is, moreover, apt to be teased by a no less frequent thrusting out of the tongue (where there is no beard) to wet the parts with mucus and saliva. Vesicular, pustular, squamous, and erythematous lesions occur at one

point or along the entire line of the lip, with frequently resulting crusts and fissures. The vermilion border of the lips commonly participates in the process. The lips become hot, and sometimes much thickened by the swelling and infiltration, their mucous faces being rarely implicated. Scarlet, dull-red, and peculiarly purplish hues of the vermilion border become visible. The parts are more picked than scratched, though the itching at times is severe. The pustular and vesicular forms are more common in children. The erythematous form, its reddened outline roughened by scales evenly projected beyond the vermilion border, is rather an affection of maturer years. In many cases the disease is aggravated by nasal discharges which flow over the upper lip, giving the latter an elephantiasic aspect. In eczema of the hairy lip the symptoms and treatment are those of eczema barbæ.

Diagnosis.—The diagnosis is between hyphogenous sycosis, herpes labialis, epithelioma, and syphilis. The first is accompanied by loosening of the hairs, caused by a vegetable parasite; the second is vesicular in lesion, brief in duration, and trivial in severity; the third is a disease of advanced years rather than of early and middle life, and is accompanied by characteristic induration and ulceration and not by itching. Syphilis frequently attacks the angles of the lips; in most cases when thus limited, typical mucous patches of the mouth can be discovered. The lesions of syphilis at the angles of the mouth are seldom linear fissures, but are more often definitely outlined erosions, secreting a puriform mucus. Pustules and resulting crusts of the lips and the nose in female children are often eczematoid features due to the picking and scratching caused by lice upon the scalp.

Treatment.—In male patients the pipe, the cigarette, and the cigar, as well as the tobacco chewed and expectorated, may aggravate the malady. In all cases it is obstinate and calls for either emollient, stimulant, or protective applications. In eczema of the lips displaying acute and painful symptoms, frequent fomentations of the part with soft rags dipped in hot mucilaginous and alkaline waters will aid in controlling the swelling and in alleviating the pain. After such bathing some soothing ointment should be applied. In chronic cases, in which stimulation is demanded, this can be effected at the time of dressing, the parts being subsequently protected by collodion or other material. Phenol and silver nitrate are often needed for such dressing.

Equal parts of tincture of benzoin, alcohol, and glycerin applied frequently during the day supply an excellent combination for the vermilion border. For protecting this portion of the lip cold-cream or other simple salve, to which has been added enough white wax to make as stiff an ointment as can be spread with the finger, is recommended. A drachm (4.) of the compound tincture of benzoin, with 5 to 20 (0.33–1.33) grains of tannin, may often be added to such ointment with good results.

Eczema of the Nostrils (*Eczema Narium*) is naturally often associated with a chronic coryza. Inasmuch as one of the common symptoms of hereditary syphilis is "the snuffles," the physician should

carefully exclude the possibility of such disorder in every instance when an infant with coryza exhibits an "eczema" of the nares or of the lips. The age of the patient, an inspection of its anal region (which should never be omitted in infantile eczema), and the history of the case will throw considerable light upon this important question.

Whether occurring in the adolescent or the child, the disease may linger only upon the alæ in the pustular or the squamous form, or may block the nares with crusts. In infants this obstruction enforces mouth-breathing, and the grasp of the nipple by the lips is thus interrupted either by respiratory acts or cries of agitation. The Schneiderian membrane participates in the inflammatory process and pours out its secretion upon the eczematous skin. This membrane when inspected is seen to be either raw and succulent, or in a condition analogous to that seen in pharyngitis sicca; that is, dry, glazed, and free from discharge. The nostrils are often thickened in consequence of infiltration, or are fissured, especially at the lines of the nares, laterally and inferiorly. In severe cases, and when the lips participate in this process, the pouting, swollen, and distorted organs suggest the snout of the lower animals. Adults, as a result, frequently suffer from coccogenous sycosis and furunculosis.

Treatment.—In treating these cases all crusts should be removed and the parts carefully protected. Picking of the nose in children should be prevented, if needful by the "straight-jacket." Pencillings with compound tincture of benzoin, iodized phenol, silver nitrate, or collodion often prove serviceable.

In softening crusts oil may be freely used. For this purpose the warm carbolized oil-spray of the atomizer or a glycerin-lotion answers well. After softening and removal of the crusts, a simple ointment containing from 5 to 20 grains (0.33–1.33) of boric acid, or from 2 to 10 (0.133–0.66) grains of ammoniated mercury to the ounce (30.), may be used. A weak citrine ointment is often serviceable. When the disease extends well up in the nares, Neumann employs bougies made by combining 2 grains (0.133) of zinc-oxid with 16 grains (1.06) of cocoa-butter. Hardaway recommends equal parts of cold-cream salve and glycerol of lead subacetate.

Eczema of the Ears (*Eczema Aurium*).—The ears are affected with eczema both in infancy and maturer years, rather more often in women and children, the disease being limited to the whole or part of the organ, or extending backward over the postauricular region, or downward over the ramus of the superior maxilla. The eczema may be acute or chronic, and commonly originates in seborrheic dermatitis (which see) of the scalp or the face, but may find its origin in chronic discharges from the external auditory meatus; in the growth of aspergillus in the same canal; in exposure to temperature-changes, especially with high winds; in frostbite; in the irritation set up by pediculi and by the auricular rim of the frame of spectacles; in the toxic effect induced by the hook of cheap ear-rings and by dyed bonnet

ribbons; in the traumatism of ear-piercing; and in the habit of unnecessarily picking the ear to relieve it of wax or of trifling sensations of irritation.

Symptoms.—The pustular and moist forms are common at the superior, inferior, and posterior boundaries of the pinna, where a linear fissure is apt to form in the line of the angle made by the auricle with the plane of the adjacent integument. The motions imparted to the ear by handling it, or by placing the hat on the head and tying hat-strings over the ear, always tend to aggravate the disorder. Long hairs worn over the ears have a similar effect, by the production of friction and the retention of heat. The lobules may display the erythematous and scaly phases of eczema, becoming infiltrated, and having a deformed appearance and lurid-red color, the affection pursuing an indolent course. The lobules alone of both ears in young women may similarly be affected, and may exhibit these phenomena for consecutive years.

Sometimes the entire auricles are uniformly dark-red, infiltrated, alternately weeping and scaling, and project to a noticeable extent from the side of the head in consequence of their increase in bulk. The itching is usually more annoying than severe, being accompanied by a characteristic sensation of tenseness and fullness of the part. Like the eczema which occurs at the other mucous outlets of the body, the affection in the meatus is particularly obstinate when it assumes a chronic form. Symmetry to the extent of involving both ears, though commonly to a different degree in each, is rather the rule than the exception, and is doubtless due to the simultaneous operation of effective causes.

Diagnosis.—Eczema of the ears is to be distinguished from seborrheic dermatitis, dermatitis venenata, and pyogenic infections occurring in this region.

Treatment.—The treatment should at first be soothing and protective by the use of zinc-salve or diachylon ointment or by soothing and astringent lotions; afterward stimulation may be needed. A firm bandaging of the ears to the head may be required to support them, to prevent irregular pressure (of the head upon the pillow), and to retain external medicaments. In chronic cases stimulating applications are often well tolerated, and sulphur, salicylic acid, ichthyol, and tar-ointments here play an important part. Treatment appropriate to the otitis externa or to the aspergillus may be required. Bulkley recommends an ointment of 1 drachm (4.) of tannin to the ounce (30.), deeply and thoroughly passed into the meatus on a camel's-hair brush. French authors generally advise small tampons smeared with an ointment and left in the canal. Burnett employs 2 drachms (8.) of oil of tar to 1 ounce (30.) of alcohol. Great benefit is derived from painting the indolent surfaces with solutions of silver nitrate. The intractable forms almost invariably affect adults, in whom there is usually a history of improvement under treatment, followed by relapse, due to exposure to wind, heat, cold, or other sources of irritation. Many

cases require the treatment recommended for dermatitis seborrheica; others may require radiotherapy.

Eczema of the Eyelids (*Eczema Palpebrarum*).—In eczema of the eyelids the free edges of the eyelid, or the skin over the orbital margin of the tarsal cartilage, may chiefly be affected, both in children and adults. When the free edge of the eyelid is involved, there is present a species of coccogenous sycosis, the hair-follicles becoming inflamed and furnishing a purulent discharge, which may agglutinate the lids. The latter are thickened and swollen, become the seat of moderate itching, are picked rather than scratched, and exhibit minute crusts between, or glued to, the hairs. The disorder is often accompanied by a seborrhea of the Meibomian follicles, and is described by oculists under the designation of *blepharitis* or *tinea tarsi*. Inasmuch as the facial expression is characteristic when the eyelids are thus involved, patients exhibiting this form of eczema are usually set down as "scrofulous," though the disorder occurs in many individuals with no sign of struma, and eczema surely is not such a sign.

Fissures occasionally form at the commissure of the eyelids. The disorder may complicate eczema of other parts of the face. In erythematous eczema faciei of adults there is usually swelling, with puffiness, especially of the lower eyelid. The conjunctiva may or may not be implicated. A chronic granular condition of the eyelids is not noted as frequently as might be suggested *a priori*.

Diagnosis.—In the diagnosis care must be taken to exclude syphilis, lupus, and pediculi. Piedra of the eyelashes must not be overlooked. Instead of the ordinary nits of the lash, there are in such cases jet-black, pinhead-sized masses of ivory-like hardness attached to the hairs.

Treatment.—The edges of the eyelids should be cleansed carefully with a weak alkaline solution and a soft camel's-hair brush whenever the eyelid is involved, and then as carefully dried and anointed with cold-cream salve. In acute cases the closed eyelids may be bathed frequently with warm solutions of boric acid or of borax (1 to 2 drachms (4. to 8.) to the pint (480.)), and strips of soft lint, soaked in the same solution, or in a very dilute glycerin and phenol solution, may be laid over the closed lids for as long periods during the day as these remedies are comfortably tolerated. In chronic cases red mercuric oxid ointment, from 1 grain to 10 (0.066–0.66) to the ounce (30.), with or without an equal quantity of salicylic acid, is held in high esteem. Ophthalmologists, in the treatment of this affection, frequently use an ointment of yellow mercuric oxid, 1 to 3 grains (0.066 to 0.2) to the drachm (4.). In place of these mercurials the unguentum hydrargyri nitratis, 1 part to 6 of cold-cream salve, may be applied, or resorcin 1 part to 100 of simple unguent. Epilation of the eyelashes may be necessary. Pencillings with solutions of silver nitrate in various strengths are also useful in chronic cases, but these solutions must carefully be confined to the eyelids, and not be suffered to come in contact with the conjunctiva. Excessive use of the eyes must be prohibited.

Eczema of the Beard (*Eczema Barbæ*).—Eczema may involve the region of the beard only, or it may exist in connection with the disease on other parts of the face.

Symptoms.—In recent cases there is no loss of hair, but in those of long standing the hairs are thinned and fail to hide completely the reddened surface beneath, covered here and there with pustules or displaying floors of broken pustules, dried inflammatory products, yellowish and greenish scales and crusts. Beneath the crusts the surface is smooth, not lumpy, as in hyphogenous sycosis. The hair-follicles are not solely involved, as in the coccogenous form of sycosis, but evidently they and the integument between them are inflamed. In chronic cases the symptoms may be those of erythematous and scaling eczema. In recent eczema the hairs are not loosened in their follicles, but in chronic cases such loosening does occur, and there is a true *defluvium capillitii*. The disorder is one primarily involving the skin, and secondarily the hair-follicles, extending as smoothly over the surface as an eczema on the cheek of a woman. There is commonly a certain degree of symmetry, to the extent, at least, of involving the beard in different degrees on both cheeks at once, or the chin on both sides; often the symmetry is perfect. Symmetry is rare in the several sycoses of the same part.

The disease is accompanied by itching, rarely so severe as upon the smooth parts of the face, is particularly obstinate, and is extremely disfiguring. When extending into the region of the beard from other parts, there is usually association with eczema of the ears. When limited to the region of the moustache, there may be an eczema of the nares and a chronic nasal catarrh or seborrheic dermatitis.

Diagnosis.—The condition is more superficial than that of hyphogenous sycosis. There are no deep-seated nodules, as in the latter disease. From coccogenous sycosis, eczema of the bearded region is differentiated with greater difficulty, as the two conditions have many features in common. Sycosis is primarily an inflammation of the hair-follicles, a distinct folliculitis, and presents a characteristic pustule, pierced by a hair, at the mouth of the follicle. In this disease there are also found papules and small tubercles. Though there is a superficial inflammation of the follicle in eczema of the beard, a distinct folliculitis is not present and there are no papules or tubercles. Moreover, the skin-surface between the follicles is evenly involved in eczema, while it frequently escapes wholly or in part in sycosis. Eczema quite commonly coexists on other portions of the face, and is more apt to be accompanied by itching, while sycosis is limited strictly to the region of the beard. It must be remembered, however, that an eczema barbæ is often the forerunner of a genuine coccogenous sycosis.

Treatment.—The treatment of recent cases of eczema of the bearded region is that of similar phases of the disease on other parts of the body, by means of the simpler lotions and ointments; but cases of long standing are exceedingly stubborn and frequently require vigorous measures. After removing crusts and other accumulations by soaking with

oil and thorough washing with soap and water, the beard must be wholly removed. Clipping short the hairs of the face will not answer, though this is generally preferred by the patient, as exposing to a less degree the unsightly surface beneath. Nothing short of epilation or of shaving, and repeated shaving every second day, will effect the desired result in chronic cases. As soon as the disease is reduced practically to an eczema of the non-hairy parts, it improves in proportion to its distance from the mucous outlets of the body. When limited to the bearded cheeks, the most obstinate cases in the course of a single month may be robbed of one-half their unsightliness. The patient should be encouraged by reminding him that usually it is but the first step which costs, each succeeding removal of the beard being accomplished with greater comfort to himself physically and mentally. After each shaving the skin should be bathed with water as hot as tolerable, and, if at night, a lotion or an ointment, or the latter after the former, may be used. The salves most useful for this purpose are sulphur, 10 to 60 grains to the ounce (0.66-4. to 30.); diachylon ointment with salicylic acid, 5 to 10 grains to the ounce (0.33-0.66 to 30.); and zinc- or tar-ointment. Rarely the surface requires painting with weak solutions of silver nitrate. As the condition improves a dusting-powder will afford needed protection during the day. The shaving should be continued for months after the disease is at an end.

Eczema of the Genital Organs (*Eczema Genitalium*) is remarkable for the severity of the subjective sensations it occasions; for its tendency to persistence, recrudescence, and nocturnal exacerbation; and for the liability to the production of the sexual orgasm by the act of scratching. In men the surfaces most often involved are the anterior, posterior or lateral faces of the scrotum where they meet the thigh, though the surface of the penis, as also that of the pubes and the perineum, may be involved. In women the labia majora, more rarely the labia minora and vestibule of the vagina, are affected, with occasionally extension of the disease to the same contiguous parts as in men.

Eczema thus located is, as a French writer has well said, "a dry disease in a moist locality." Vesicular and pustular forms are much rarer than the erythematous, the papular, the papulo-squamous, and the erythemato-squamous. In women the moister forms are more frequent, doubtless because of the wider mucous outlet and the more extensive mucous tract in the vicinage. The labia are then heightened in color, edematous, agglutinated by crusts, and often torn viciously by the finger-nails. Blood-crusts excoriations are seen in most of the severe cases. An eczema intertrigo at the labio-femoral angle is common. Over the whole may be poured the normal or pathologically altered secretions from uterus or vagina. The disease, however, is sufficiently common after the menopause, when there is usually physiological atrophy of the uterus.

Symptoms.—The typical disease in men is recognized in the thickened, reddened, perhaps slightly scaling, integument of the scrotum,

which may also be fissured, excoriated by the finger-nails, or covered with blood-crusts. Torn papules, even tubercles and nodose swellings, may be closely packed together, exhibiting a lurid or even purplish hue. In aggravated cases the infiltration is so great as to deform the parts, increasing the thickness and deepening the normal furrows of the scrotal integument to the grade of many times its normal condition, producing thus an elephantiasic appearance. In eczema of the penis, also, the prominent symptoms are edema, itching, and redness, with slight scaliness.

In both sexes, as before indicated, attempts on the part of the sufferer to relieve the itching are often as severe and prolonged as they are ingenious. Commonly no relief is obtained until a serous sweating or weeping of the thickened tissues is induced by the friction. Inasmuch as the latter in severe cases is frequently repeated, the physical dangers are obvious.

Apart from this, however, the disorder has a marked tendency to disturb the mental tone and the general health. Shame deters many from seeking speedy relief, so that cases of long standing are often registered by the physician. Though unconnected with venereal disease of any kind, there is for many a special dread of an eczema of these parts, simply because of its location. With sleep disturbed, the mind agitated, and the nervous system teased by an intolerable itching, one can scarcely wonder at the eloquence with which many patients describe their sufferings. It is a disease of middle life and of advanced years. It is rare to see a well-marked, obstinate case in a child.

Etiology.—The causes, exciting and aggravating, of eczema of the genital region are often obscure, but undoubtedly depend largely upon heat, moisture, and friction. These factors are favored, first, by the effect of gravity, the organs in question being situated, when the body is in the erect position, at the inferior apex of the double cone forming the trunk, and being thus subject to the force of gravity; second, by the arrangement of the clothing in both sexes, by which heat and friction-effects are heightened; third, by uncleanness, the secretions and discharges from the adjacent mucous tracts being suffered to accumulate upon the person. The cause may lie in some disturbance of the genital organs or of the nervous system.

In many eczemas of the surface, and especially those of the genital region, the urine will be found to contain albumin or sugar, and these conditions have been supposed to lie at the root of the eczema. Aside from the fact that the presence of these substances in the urine points usually to constitutional abnormalities, which in themselves might predispose the skin to eczematous attacks, it may be said of sugar that it is, *per se*, a profound irritant to the skin and mucous membranes. Any part moistened constantly or intermittently with saccharine urine will respond eventually with an outburst of eczema. Sugar and albumin are known, however, to be producible in urine by external irritants, among which are cutaneous diseases. If a patient with saccharine urine and severe genital eczema be kept in bed in the recumbent posi-

tion for a few days, while any soothing application productive of comfort is continuously applied to the tender and excoriated surface, the sugar may rapidly disappear from the urine. Many cases of extensive and severe eczema of the genital region in both sexes occur in patients in whom careful and repeated examination of the urine fails to reveal sugar, but this examination should be made in every case. Genital eczema occurring with glycosuria is one of a group of disorders named by French authors *Diabétides Génitales*.

Diagnosis.—The diagnosis of eczema of the genital organs is between ringworm, acne, pruritus, scabies, pediculosis, the venereal disorders, and herpes progenitalis. The first-named affection may occur alone or may induce or may be grafted upon the eczema. Ringworm may be recognized by the discovery of the fungus, and is clinically distinguished by the crescentic edge of the spreading patch, its convex border looking away from the genital centre. The “follicular vulvitis” of gynecological authors is a genital acne and is manifestly limited to the glands and the periglandular tissues. The same is true of bromin and iodine acne, which may be developed in the same situation in both sexes. Genital pruritus may beget an eczema from scratching, but it is accompanied primarily by no skin-lesion. The pruritic, papular lesions of scabies upon the male genitalia are always associated with typical manifestations elsewhere on the body. The pubic louse is visible to the eye, as are also its reddish excreta and nits. The ulcers and sclerosis of chancroid and primary syphilis are rarely accompanied by itching, and, though occasionally multiple, never exhibit diffuse patches of disease. Syphilodermata are recognizable by their characteristic features and the history of an infectious disease. In herpes progenitalis there are precedent burning, smarting, or neuralgic sensations, the occurrence of vesicles or groups of vesicles (lesions rare in eczema of the genitals), and frequent limitation of the disorder to the mucous surfaces or to the muco-cutaneous lip by which such surfaces are bounded. In eczema these boundaries are usually respected and the disease is much more strictly cutaneous.

Treatment.—The treatment is to be conducted on the general principles heretofore outlined. Careful attention should be directed to the diet and the habits of living. In diabetic cases every effort should be made to remove or reduce the sugar present in the urine by an appropriate regimen. Sponging of the genital region with alkaline water as hot as can well be tolerated, followed by the blander lotions, oils, and ointments at night, and the use of antipruritic dusting-powders in the daytime, must not be omitted. In eczema of the scrotum a suspensory bandage lined with lint, which is wet with a lotion, smeared with an ointment, or thoroughly covered with a powder, can usually be employed with advantage. The habit of scratching must be broken up at all hazards. In chronic cases treatment by soft soap and diachylon ointment will be found useful. Caustics, solutions of mercuric chlorid and other mercurials, phenol, and especially the tarry compounds, are often necessary. The Lassar paste also may be used with advantage.

In some persistent cases, with decided infiltration, radiotherapy has given prompt relief.

The following formulæ are useful in allaying the irritation of some acute and subacute cases:

R—Liniment. calcis,	f℥iv;	120	M.
Zinci oxid.,	℥ij;	8	
Glycerini,	f℥ij;	8	
Liq. calcis,	f℥iv;	120	

Sig.—Lotion to be applied at night after bathing the parts with hot water.

R—Liniment. calcis,	f℥iv;	120	M.
Acid. hydrocyanic. dil.,	f℥j;	4	
Liq. plumbi subacetat.,	f℥ij;	8	
Glycerini,	f℥ij;	8	
Aq. ros.,	ad f℥viii;	240	

Sig.—Cream, for application on strips of old linen.

Exceedingly obstinate eczema of the pubic region is benefited by shaving and subsequent appropriate treatment. When complicated by intertrigo, the latter condition requires special relief by the interposition of soft lint spread with an ointment.

Eczema of the Anus and Anal Region (*Eczema Ani*), in its etiology and characteristics, is closely allied to the same disease in the genital region. The presence of ascarides and hemorrhoids occasionally induces or aggravates the disorder; though this complication is rarer than is commonly supposed. Multitudes of men and women who suffer from piles never complain of eczema. The eczema may occur in erythematous, squamous, or papular form, in the order named; thus exhibiting here, as on the genitals, "a dry disease in a moist locality."

The redness, infiltration, and itching may be limited to the verge of the anus, radiate from the latter in stellate lines, creep upward between the nates in the cleft, sweep forward over the perineum to the genital region, or extend laterally, with intermediate intertrigo, over the inner face of each thigh. Rarely the buttocks are covered with the same lesions. Fissures and excoriations are apt to appear about the anal orifice.

This disease is common in infancy, when want of attention to the removal of the napkin is a fertile source of mischief; and also in persons in middle life and in advanced years, when it becomes particularly intractable. The itching is intense in the latter class, with frequent nocturnal exacerbation. Unfortunately, the scratching is often reflex, and is practised during sleep, from which the patients are often aroused by their manipulations. Pollutions, fully recognized or occurring during profound sleep, or, more usually, in states of semi-consciousness, complicate certain cases; defecation becomes painful; the harassed nervous system of the sufferer is often in a deplorably wretched condition. In cases of long standing the usual congested, thickened, infiltrated, and almost elephantiasic appearance of the skin is presented, with occasional fissures and exaggeration of the natural

furrows. The part may simulate in aspect the formidable conditions discovered in passive pederasty.

Treatment.—In the treatment of these cases the use of very hot water by sponging, and the subsequent application of ointments, in some cases mild but in others stimulating, have yielded the best results. In the case of infants dusting-powders and the blander ointments are alone to be employed; in adults, especially in chronic cases, tar in some form is especially valuable. Here the Lassar paste may be applied, or tincture of tar be freely painted over the surface; or there may be used one of the tarry ointments, such as the Wilkinson salve, of sufficient firmness to retain its form as an unguent when subjected to the heat of the part. Caustics, especially the silver nitrate in crayon, are useful when there are fissures and excoriations. Corrosive sublimate, $\frac{1}{4}$ to $\frac{1}{2}$ of a grain (0.016–0.033) to 4 ounces (120.) of milk of almonds; Squire's glycerole of plumbic subacetate, $\frac{1}{2}$ drachm (2.) in 2 ounces (60.) of glycerin and water; or, as a substitute for the latter, soft-soap and diachylon plaster, are here of special service. Almond-oil, or an ointment containing 2 to 10 per cent. of phenol, often gives relief. Duhring recommends the following:

R—Sulphur. præcipitat.,	℥ij;	2	66
Naphtol.,	℥j;	1	33
Morph. acet.,	gr. ij;		133
Zinci carb.,	℥j;	4	
Ungt. aq. ros.,	℥j;	30	M.

When defecation is painful, the stools should be semiliquid in order to insure non-aggravation of the local disorder; not, it need scarcely be remarked, with a view to eliminating any *materies morbi* by purgation. Small tampons of cotton may be smeared with an emollient ointment and gently inserted for a short distance within the anus. Tincture of benzoin, 1 part to 8 of vaselin, may be used in this manner. Kaposi recommends cocoa-butter suppositories, containing zinc-oxid with belladonna or opium. When complicated by true fissure of the anus, the sphincter ani must be stretched or divided, or dilated with medicated bougies. At night a cataplasm is applied. The parts are washed frequently with tepid water, and the anal tampons are smeared with cocaine. During the day zinc-oxid salve, 30 grains (2.) to the ounce (30.) of vaselin, is applied, and over this are thoroughly sprinkled equal parts of zinc-oxid and bismuth-subnitrate in fine powder. Collodion medicated with 1 to 3 per cent. of salicylic acid, and lotions containing 1 scruple (1.33) of silver nitrate to the ounce (30.), are of great value in many cases. Besnier recommends the use of a clyster after each bowel-movement, the fluid being retained for only a short time.

Veiel prefers the cautious use of chrysarobin to tar, employing the latter either in the form of spirits or as tar-diachylon, 1 part to 20, gradually increasing in strength. Phenol, 1 to 5 per cent., and glycerin, 2 to 10 per cent., in elder-flower water or in almond-emulsion, are

specially indicated in fleshy women when the disorder, as is often the case, is complicated with intertrigo.

The key to most cases of anal eczema is to be sought in the dietary. This disorder, in adults particularly, is likely to be a significant symptom of gout, and without the dietetic medicinal treatment of that condition no local applications avail. Tobacco and alcohol are invariably to be excluded in the case of patients of this class; and blue pill, alkalies, colchicum, and salicylates are often needed. It is in these manifestations of eczema that health-resorts furnish their best results, necessitating and inviting, as they often do, an out-door life, an appropriate regimen, and an avoidance of stimulants. Even in children and infants, when there are no ascarides in the rectum or the vulva, the dietetic management of the patient should never be neglected.

Eczema of the Nipple and Breast of Women (*Eczema Mammæ*).—Eczema of the mammary region is common in nursing-women, either from the irritation produced by the mouth of the infant, or, more commonly, in consequence of galactorrhæa. Eczema intertrigo is common below and between the breasts. The eczema here is vesicular, erythematous, or squamous in type, with fissures at the apex, the side, or the base of the nipple. The serous ooze from the infiltrated areas dries as usual into light-colored crusts. There are the characteristic burning and itching. The disease may occur on one or both breasts, and, especially with a galactorrhæa in the summer, may spread extensively, covering both breasts, the surface of the abdomen, and the intermammary region. The circumscribed forms occur also in pregnant or in unmarried women, and are to be distinguished from scabies, which in women is prone to occur upon the breast.

Paget's Disease, which in its early stages presents all the appearances of an eczema, is more fully described in this treatise among the epitheliomata; it is sufficient here to call attention to the important fact that a fairly well-defined eczematoïd patch, surrounding the areola of the nipple or that organ only, with infiltration, itching, and possibly a fissure of the nipple, or a crust covering a superficial erosion, may be the sign of an epitheliomatous change already advanced either in the affected part only or deeper in the galactiferous ducts of the breast itself.

Treatment.—The treatment of mammary eczema is that of eczema in general. In severe cases of galactorrhæa nothing short of weaning the child and a cessation of all demands upon the breast will insure relief. Every effort should be made in milder cases to avoid this *dernier resort*. The nipple should be thoroughly cleansed after each nursing. As a rule, hot water and soap may be used for the purpose without harm and usually with benefit. Any fissure existing should be then painted with compound tincture of benzoin, tincture of myrrh containing 1 grain of mercuric chlorid to each ounce (0.06 to 30.) or weak solution (2–15 per cent.) of silver nitrate. The whole should immediately be covered with a protective ointment or paste. The zinc-

oxid or diachylon ointment spread on lint serves the purpose well. Salicylated and borated pastes are sometimes preferable. Lister's salve often does well:

R—Acid. borac. subtil. pulv.,			
Ceræ alb.,	āā gr. xv;	āā 1	
Paraffin.,			
Ol. amygdal.,	āā 3ss;	āā 2	M.

In some instances stronger and more stimulating remedies are necessary. Before the child takes the breast all but the simplest preparations should be entirely removed with oil or other unirritating agent.

Fournier recommends a breast-plate of caoutchouc. When the disease is limited to the nipple and areola in nursing-women, the glass and rubber apparatus sold in the shops may be tried in the hope of saving the nipple from mouth-contacts in nursing. Sometimes they answer admirably; often they utterly fail. Dusting-powders are valuable in mild cases and for any intertrigo that may exist between and beneath the breasts.

Eczema of the Umbilicus (*Eczema Umbilici*).—Generally in these cases a reddish and infiltrated, more or less annular, patch surrounds the umbilical depression, which may be filled with crusts. In most cases it is either induced or is aggravated by a *seborrhea fluida*, which gives origin to the peculiarly nauseating odor characteristic of the disease. Syphilodermata, pediculosis, and scabies in women are to be carefully excluded in the diagnosis.

Treatment.—Liquor sodæ chlorinatæ, phenol solutions, and, in chronic cases, iodized phenol, will be required in its management. The dressing of the navel in the newborn infant, the improperly adjusted apparatus for retention of an umbilical hernia, and the corsets or "uterine supporters" of women, should not be permitted to occasion or aggravate the disease.

Eczema Crurum (*Eczema Crurale*).—Upon the legs, where the force of gravity is more potent than in other parts of the body, aggravated forms of eczema are found complicated with varicose veins and edema, with dense infiltrations and indurations. In ancient cases the frequent elephantiasic aspect is significant, one limb being occasionally several inches larger in circumference than its fellow. The skin is covered from knee to ankle with enormous patches of eczema rubrum of an intensely angry appearance, moist and crust-covered; is dry, glazed, and of a lurid, reddish hue; or is dry, horny, and ridged with irregular projections surmounted by scales resembling the rough bark of a tree; or, again, with or without edema, the integument is tense, inelastic, seamed with scars of old varicose ulcers, and deeply and irregularly pigmented, a condition with some difficulty distinguished from syphilitic ulceration of the same region. At its onset eczema of these parts may assume any one of its known forms. In infants in long clothing, where the lower extremities are subjected to a higher temperature than in adults, the vesicular and pustular forms are common. The exceed-

ingly obstinate forms of eczema of the legs, especially those complicated with varicose veins, are, of course, chiefly encountered in middle life and in advanced years.

Diagnosis.—The diagnosis is, in general, to be established by considering the points heretofore discussed. The chief difficulty lies in distinguishing the eczema associated with ancient varicose cicatrices of the leg from syphilitic scars of the same locality that have resulted from degenerating tubercular syphilodermata or from gummata. In some cases, when no distinct history can be obtained, there will be a doubt, since the force of gravity upon the vessels, even without varicosities, produces certain common features, notably deep pigmentation, in both classes of cases. In women the sexual history is all-important, including the order of succession of abortions, miscarriages,

FIG. 50



Eczema of the legs with verrucous lesions.

and viable infants. In both sexes the discovery of other lesions, and especially of characteristic cicatrices elsewhere, must be attempted. It will be remembered that the syphilitic ulcer tends to the shape of a circle or a segment of a circle, and, though occasionally existing as the sole lesion upon one leg, it is frequently multiple, or may involve both extremities, the pigmentation in old cases occurring chiefly at the periphery of the scar. Very extensive pigmentation about ancient cicatrices, especially disposed between irregularly defined scars, is commoner in eczematous forms, as the pigmentation due to syphilis, though long-lived, is yet the more ephemeral. With periosteal nodes the diagnosis is clear.

Treatment.—The treatment of eczema of the legs does not differ from that of eczema in general, except as regards the indications to be

met relative to the support of the parts, thus counteracting the effect of gravity. In severe cases rest with the foot elevated and the leg placed in the horizontal position should be maintained, and other indications met by the use of the various liniments, lotions, and ointments already described. For those who must pursue their accustomed occupations the problem is difficult. An excellent preparation for subacute and chronic cases is found in the glycogelatin (*q. v.*), as they furnish not only protection, but also some support. Moreover, they frequently may be left in position for a week at a time. As a rule, they are not indicated in acute cases or where there is much discharge; yet in some of these cases they are well tolerated and do good. From 1 to 3 per cent. of ichthyol, thiol, or salicylic acid in most cases may be added to the glycogelatin with advantage.

A dressing well adapted to the larger number of cases of eczema of the lower limbs consists in disinfection of the surface and the application of the Lassar paste or other well-selected unguent or paste, followed by dusting the whole area with a powder, over which may be neatly applied, if desirable, a cheesecloth bandage. Often, however, this bandage may be dispensed with, as in both sexes a woman's long stocking, made light and thin, such as is used in the summer season, and always of white or undyed cotton, may be drawn over the limb. Over this stocking may be wound, for the purpose of support, either a flannel bandage cut on the bias, which can, as a rule, be applied without special skill by the inexpert, or, in chronic cases that will tolerate it, an elastic bandage, the inner white stocking being changed with each dressing. In the case of male patients it is often desirable that the man's sock be drawn over the long white stocking below. In this way support without compression (which is the essential point) may be secured.

A favorite dressing in dry, papular, erythematous, and squamous patches of the disease is applied as follows: The parts are bathed with borated water for several minutes until the itching is relieved, and then are carefully and thoroughly dried. The patch is then completely covered with a dusting-powder, which, according to the indications of the case, is either emollient, astringent, or stimulating. Finely powdered tannin with French chalk, or boric acid and starch, or bismuth subnitrate, zinc, and starch may thus be used. Strips of cheesecloth are superimposed. A snug-fitting rubber or flannel bandage cut on the bias encompasses the whole. The dressing is left *in situ* as long as it is comfortable, often for two or three days, when it can be removed. In properly selected cases the itching is relieved, the infiltration is reduced, and the patch soon loses its hyperemic aspect. Occasionally no other treatment will be required.

Eczema of the Hands and the Feet (*Eczema Manuum, Eczema Pedum*).—Eczema of the hands frequently arises from irritation induced by substances employed in the various trades and professions. On both the hands and feet it may be induced by a ringworm fungus (see chapter on Trichophytosis). Owing to the inability of most patients to give up their work, the management of the disease in these

situations is rendered more difficult. A broken-down transverse arch of the foot is cited by Ruggles¹ as a cause of eczema in this region. All forms of eczema are here seen—erythematous, vesicular, papular, pustular, and squamous—involving the entire surface, or limited to the wrists, ankles, interdigital spaces, palmar or plantar surfaces, or one or more digits of either hand or foot. The motions of the part are so free that fissures are common and often are exceedingly painful. The itching may be severe, and parts of one hand or of one foot may be extensively rubbed, torn, or abraded by the other. Vesicles are frequently encountered upon delicate portions of the skin, as upon the dorsum and interdigital spaces, while in the denser palm and sole such lesions are deep seated and do not tend to spontaneous rupture, but on puncture a clear serous or a cloudy fluid may be evacuated.

FIG. 51



Eczema fissum. (Fox.)

Palmar and Plantar Eczema is commonly asymmetrical, but may be symmetrical. The hands are more often involved than the feet. The condition is characterized by the appearance of irregular, ill-defined, more or less diffuse areas of dry, dead-whitish, or hyperemic, indurated, and thickened integument, which may be fissured or which may produce such a tense inelasticity of the surface that the digits are semiflexed into the palm or sole.

Circumscribed patches of eczema, with fairly well-defined outline, reddish in color beneath crust or scale, subacute in course, and accompanied by paroxysmal itching, are of common occurrence on the dorsum and also on the palm or the sole. In the latter situation they may be traversed by one or more painful fissures, the same being true of the fingers and the toes. Upon the back of the hand these circumscribed patches are prone to pursue an indolent course, improving temporarily under appropriate treatment and becoming aggravated by every exposure to the causes by which they were first induced.

¹ Jour. Cut. Dis., 1909, xxvii, pp. 105-111.

The long list of etiological factors which may here be efficient can scarcely be enumerated. The majority have already been considered in discussing the causes of eczema in general. The influence of all articles handled in the trades, occupations, and professions, as well as the action of toxicants and dyes, must be remembered. Thus, printers, bakers, and masons suffer in the hands, and the wearers of dyed stockings and coarse, ill-fitting shoes and boots suffer in the feet. These so-called *trade eczemas* are often due wholly to local causes and disappear promptly on removal of the latter. Such conditions should properly be classed under chronic dermatitis.

FIG. 52



Eczema orbiculare. (Howard Fox.)

Diagnosis.—In the matter of diagnosis, scabies, dysidrosis, psoriasis, and syphilis have to be considered. In scabies the vesicles are firmer, more often unruptured, are fewer, more isolated, and more intermingled with crusts, pustules, and even with bullæ, which latter are rare in eczema. The discovery of the parasite or its burrows and a history of contagion will aid in removing doubt. Numerous pustular lesions in young subjects are, however, more commonly produced by the acarus. The occurrence of the eruption on the body elsewhere than on the hand is also to be expected in scabies, with respect to which it should be remembered that the burrow may not be visible, and that it may be wanting when the parasites are present. In dysidrosis there is usually a history of hyperidrosis of the hands and feet. The lesions, which are vesicular at first, becoming pustular later, are usually larger, more deeply seated, and less numerous than in eczema; they appear in greatest numbers upon the digits, in many instances not involving

the palms or soles; are less inflammatory and produce a sensation of burning rather than itching. Exfoliation in dysidrosis leaves a tender epidermis rather than an infiltrated, oozing surface. Psoriasis of the palms and soles is almost always accompanied by the presence in other parts of the body of patches, the typical character of which should throw light on the local disorder. They are dry, non-discharging lesions, very rarely fissured as in eczema of the hands, have a distinct contour (which is rare in eczema), and are covered with more abundant and more lustrous scales. Eczema is less sharply outlined, and occurs in larger and more diffuse areas than either psoriasis or syphilis. The scaling syphilodermata of the palms and soles occur early and late in the disease, and usually after a distinct history of infection. The lesions in syphilis are usually isolated, firm, deep infiltrations, circular in outline, with very sharp definition, and they may be covered with dry, adherent, dirty-white scales, beneath which the brown-and-red hue of the persistent lesion can be discovered. Superficial or deep circular excavations of tissue, single or multiple, with punched or ragged edges, are visible. The eruption is rarely, like eczema, accompanied by itching or by discharge, but painful fissures may form. It occasionally affects the dorsum of the hand or the foot, favorite sites of eczema manuum, but almost invariably it has in such cases swept thither from the palm or from the sole.

In both syphilis and eczema of the hand, unless the patient be left-handed, the right hand is usually more involved, even when there is apparent symmetry of distribution of lesions.

Treatment.—The treatment demands, first, rest for the extremities and a simultaneous discontinuance of the exciting cause. In the trades the result of the latter can usually be demonstrated by the patient, who notices the improvement in the condition of the skin on Monday morning after a Sunday's rest. When practicable, protection during labor must be secured by the use of gloves, neatly applied finger-cots, rubber-stalls, or bandages retaining a dressing on the part of the hand or the foot that is the seat of the disease. For circumscribed, non-discharging patches on the dorsum of the hand or the foot, the dressing described in connection with eczema of the extremities may be applied. When the nature of the labor performed is such as to render it impossible to secure protection of the hands or fingers in this way, something may be accomplished in a few cases by directing that the hand be frequently dipped in a protective solution or powdered during the hours of labor. Thus, printers may dust their fingers with lycopodium, and individuals compelled to retain their hands in irritating solutions can anoint these members occasionally with an oily or fatty substance. Generally, it may be said that eczematous hands are too frequently brought in contact with water; the ill effects of this are made evident not only in laundresses, but also in those who personally must attend to the ordinary duties of the household. For cleansing the hands oat-meal water may be used and after each washing they should immediately be covered with a suitable dressing, or with a simple lotion,

ointment, or powder. For protection of the hands and for the retention of dressings the cheap white cotton gloves, such as are worn by infantrymen, are convenient and serviceable. They should be large enough to go on over the dressings easily and should be washed as soon as soiled. For mild cases equal parts of tincture of benzoin, glycerin, and alcohol, diluted more or less with water, make a serviceable and agreeable application. When extensively and acutely involved, the hand should be dressed with care, each finger being separately wrapped in gauze which has been soaked in a lotion or oil or has been spread with the selected ointment or paste, and the whole covered with a bandage or other dressing.

The local application must be chosen in accordance with the principles previously given for the treatment of eczema in general. In subacute and chronic types tarry compounds are very useful, and caustics more than ever needful when there are fissures. The fissures may often with advantage be painted with compound tincture of benzoin. Protective flexile collodion plays an admirable part about the finger-nails, where irritable seams and fissures form, with over-hanging fringes of torn and ragged epidermis, bordered with red. In painful eczemas of this region the immersion, particularly at night, of the entire hand or foot in hot borated water may be practised, followed by careful drying and dressing with the selected applications.

When the epidermis of the palm is greatly thickened it should be shampooed at night with green soap, pure or in spirit, with the aid of hot water, followed by a salicylated soap-plaster or by a salve containing ammoniated mercury, 10 to 20 grains to the ounce (0.66–1.33 to 30.), or some preparation of tar. For intractable cases caustic potash, in the strength of 20 to 30 per cent. solutions, can be mopped well into the thickened palm and be followed by a salve application. Crocker suggests the application of dressings moistened with a solution of pancreatin or papain to the areas of thickened epidermis, the purpose being to soften the cells by digestion.

A paste useful in many mild cases and one which dries rapidly is made of 10 parts each of glycerin, dextrin, and water. To this may be added from 1 to 3 per cent. of thiol or ichthyol. The ingredients are mixed on a hot water-bath and form a sort of liniment, which may be painted on the skin. Unna's litharge-glycerin-starch paste, described on a preceding page, is also a valuable and effective preparation for subacute cases. For chronic, sluggish eczema of the palm, Duhring recommends an ointment composed of equal parts of mercurous nitrate, plumbic acetate, and zinc-oxid ointments.

Radiotherapy has given excellent results in a number of these cases, the technique being that employed in the treatment of psoriasis.

For the fingers and hands Unna's mull-plasters (but only if freshly imported) fill every requirement. These plasters may be cut into strips and be applied with neatness to every digit. Zinc-oxid, salicylic acid, tar, and ichthyol mulls are all available for this purpose.

The condition known as *chapping* of the hands and face is, properly

PLATE III



Traumatic Dermatitis Consecutive to Pruritus Cutaneus.

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peaking, a dermatitis, since it is usually dependent upon exposure to wind and weather and disappears when the cause is removed. It sometimes occurs, however, as a condition indistinguishable clinically from mild eczema of this region. In those subject to this disorder care should be taken through the changeable weather of spring and autumn not to expose the skin to cold or wind, especially if the hands have been previously immersed in water and are not perfectly dry. In many instances the mischief can be prevented by a simple oiling of the skin after each washing, or instead of oil equal parts of tincture of benzoin, glycerin, and alcohol may be used. This last preparation is not only a preventive, but it often affords relief in mild cases. Severer forms should be treated as corresponding grades of dermatitis or of eczema.

Eczema as it Affects the Nails (*Eczema Unguium*).—For description of this affection, see the section devoted to Diseases of the Nails.

Eczema of the Tropics.—Prickly Heat (*Eczema Solare, Lichen Tropicus, Miliaria Rubra, etc.*).—For description of this disorder, see the chapter devoted to this topic.

Universal Eczema.—Patients thus affected should be treated in bed. The diet, which is of great importance, should be of unstimulating quality; but it is not to be forgotten that in a disease involving the entire surface of the body the strength is sooner or later liable to be exhausted, and a supporting dietary, even ferruginous tonics, is often required.

DERMATITIS.

Synonyms.—Ger., Hautentzündung; Fr., Dermatite, Dermite.

Inflammation of the skin occurs in a large number of cutaneous affections. Under dermatitis, however, are grouped those inflammations only in which the result is plainly due to a direct influence exerted upon the skin by thermal, chemical, or mechanical agencies. The inflammatory process may involve the superficial or the deep portion of the integument, or it may extend to the subcutaneous tissues, and even deeper. The symptoms vary with the nature of the cause, the extent and degree of its influence, and the circumstances attending its operation. There may be simple hyperemia and edema of a few hours' duration, or there may follow papules, vesicles, bullæ, pustules, and crusts. These lesions may be situated on an intensely reddened and much swollen base. In severe cases ulceration, gangrene, and extensive scarring may occur. With these phenomena there may be general symptoms of mild or of severe grade, due to the influence exerted by the local process upon the general economy. When the exciting cause is of moderate intensity but is long continued, there results a chronic dermatitis, in which the skin may be more or less thickened and infiltrated, dull-red in color, and covered with fine, adherent scales.

Dermatitis Traumatica.—External violence, varying in character and severity, is capable of inducing dermatitis, the symptoms of which differ in degree, though their career is, in general, the same. In this

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list are included the inflammations produced by surgical interference with the continuity of the integument; excoriations caused by scratching, by friction with garments and other articles injuriously acting upon the skin; by the various implements handled in the trades; and by the bites or stings of beasts, insects, reptiles, and fishes, when the result is traumatic and not toxic in character. These injuries may be in the form of contusion, blow, concussion, pressure, puncture, incision, or laceration; and the consequences be declared in heat, swelling, redness and pain; in itching, burning, stinging, or pricking sensations; with subsequent inflammatory symptoms, varying in grade from mild and transitory hyperemia and exudation to the severer grades of inflammation mentioned in the preceding paragraph.

Dermatitis Venenata.—Dermatitis venenata is an acute inflammation of the skin caused by the external application of various substances of animal, vegetable, or chemical nature, characterized by redness and swelling, frequently by vesicles and bullæ, and accompanied by sensations of itching, burning, etc., in varying degrees.

FIG. 53



Dermatitis venenata. (Fox.)

Symptoms.—Careful observation of a typical case of dermatitis venenata soon after the onset of symptoms will disclose the exact surface of contact, such surface being distinctly outlined by a reddened, tolerably well-defined line, within the limitation of which will be seen a slightly tumefied, erythematous area, at times displaying closely-packed, pinpoint-sized papules, vesicles, or pustules. As the dermatitis progresses it is not necessarily limited to the surface with which the irritant has come in contact. The inflammation may extend to adjacent portions of the skin, or, as a result of absorption and consequent toxic effects, or of reflex nervous irritation, it may appear on distant surfaces of the body. Numerous types of cutaneous lesions—macules, pustules, papules, vesicles, bullæ, wheals, scales, crusts—free serous and purulent discharges, subcutaneous abscesses, and even gangrene with sloughing, may occur, the result being largely proportioned to the character of the agent producing the injury and to the susceptibility of the individual.

The eruption produced by the poison-ivy and other varieties of *rhus* is largely an American disease; and from its frequency in the United

States has attracted a great deal of attention. A certain degree of susceptibility to the poisonous action of the plant is requisite for the

FIG. 54



Dermatitis venenata produced by chemicals.

FIG. 55



Dermatitis venenata. (Fox.)

production of its effects, as some individuals can handle the leaves of the plant with impunity, while others, it is claimed, are affected by its exhalations within a circle having a radius of several feet. It is,

however, difficult to demonstrate the truth of the last statement, suspecting, as one may, that such instances may be cases of contact with other than the suspected plant. The parts commonly affected are the hands and the regions to which the latter are carried, such as the face, the genitals, the arms, the thighs, and the neck; barefoot children suffer in the feet and the legs. Usually the symptoms are developed in the course of a few hours, and they consist of erythematous patches; scanty or profuse vesiculation, with abundant serous weeping after rupture of the lesions; swelling, edema, and disfigurement; and intense burning and itching sensations. Serious effects are occasionally pro-

FIG. 56



Rhus radicans: leaf one-half natural size. (Culbreth.)

duced. Deeply attached scars may result from subcutaneous abscesses of parts greatly swollen. Occasionally, in particularly sensitive skins, the eruption spreads from the skin-surface affected by the poison to that where presumably none has been applied. It should be remembered, however, that articles of clothing may for brief periods of time furnish sources of further trouble, being worn at the moment of contact with the plant, then laid aside, and, the occasion quite forgotten, being subsequently employed. Thus, a pair of undressed-kid gloves after lying for two weeks untouched have sufficed to awaken the disease.

An important variety of dermatitis venenata is that produced by the primrose (*Primula obconica*, chiefly), a number of examples having been seen by the author. Foerster¹ regards primula dermatitis as not uncommon, having seen over forty cases in seven years. Sharpe² recorded examples produced by the *Primula farinosa*, a variety of the plant which grows wild.

Etiology.—Among the sources of dermatitis venenata may be named several members of the *rhus* family (*Rhus toxicodendron* (poison-ivy) and *Rhus venenata* (poison-sumach)), the nettle, the smartweed (*Polygonum punctatum*), cowhage (*Mucuna pruriens*), several members of the primrose family (*Primula obconica*, *Primula sinensis*, *Primula cortusoides*, and *Primula Sieboldii*), most of the strong acids and alkalis, croton-oil, cantharides, mustard, tartar emetic, mezereon, the salts of mercury, arnica, turpentine, ether, chloroform, tarry compounds, resorcin, many of the dyes, and glass in fine powder or in delicate filaments, such as are thrust into the skin when handling certain articles of Venetian glassware. A common cause of acute dermatitis about the forehead, eyes and face is found in the proprietary hair-dyes found on the market. This list might be extended indefinitely, as there are few articles which are not capable of producing some irritation of the surface of the skin if applied to it with sufficient vigor and for a certain period of time; and in some cases it is difficult to decide whether the effect is more traumatic than toxic. An almost equally long list of substances of animal origin having poisonous effects upon the integument might be named, such as decomposed or ammoniacal urine, feces, ichorous pus, and pathologically altered secretions from the uterus, the eye, ear and nose.

A few of the more common causes of dermatitis are: the use of soap containing an excess of alkali, or even minute particles of bone, for laundry, toilet, or other domestic purposes, as also several of the proprietary articles sold in the shops for similar employment. Stockings and other undergarments dyed with anilin, picric acid, chromium, or arsenic; the leather lining of the inside of the hat or the cap, and the painted toys to which the lips of children are applied, will beget mischief in the various regions of contact for each. Duhring reports cases in which the dyestuff in the lining of shoes penetrated the material of stockings in women, and produced dermatitis of the feet or the legs.

The tincture of arnica, an article much used as a domestic application for contused and incised wounds of a simple character, has produced very serious annoyance in some cases. The number of these accidents is annually increasing. Cartier³ reports excessive erysipelatous swelling, a phlyctenular eruption, and submaxillary adenopathy resulting from the external use of arnica. Beauvais reported to the Paris Medical Society gangrenous results in one case. Buchner

¹ Jour. Amer. Med. Assoc., August 20, 1910, p. 642 (a thorough discussion of the clinical features of the disease, with a description of the botanical and chemical characteristics of the plants).

² Ibid., December 14, 1912, p. 2148.

³ Lyon Méd., April 13, 1884.

believes this poisonous action to be due to insects (particularly the *Atherix maculatus*) found in the calyx of the arnica-flower. Other native plants, a large number of which are enumerated in a valuable monograph and supplemental list by J. C. White,¹ are similarly effective. Wesener² reports that the Malacca bean-tree (*Anacardium orientale*) furnishes a caustic oil, called "cardol," or *cardoleum pruriens*, that produces, after application to the skin, vesicles and vesicopustules, which contain cardol and terminate by crusting. He reports a generalized eruption, beginning on the face, due to this cause. Metol, a substance largely used by amateur photographers, produces in susceptible skins a marked dermatitis similar to that induced by ivy. Several marked examples have been seen by the author. Beevo³ and others report similar observations. Bernstein⁴ reports nine cases of dermatitis produced by dinitrochlorbenzol, a substance used in the manufacture of dye-stuffs. Irvine⁵ reports cases of dermatitis produced by benetol. MacKee⁶ reports cases of dermatitis in workers in coco-bolo wood. Wilmot Evans⁷ reports cases of dermatitis due to teak.

The antiseptic dressings of modern surgery are at times responsible for eruptive disorders. Orthoform has produced in a number of patients coming under our observation an acute vesicular and bullous dermatitis. Brady⁸ reports an example of orthoform susceptibility. Dubreuilh⁹ records cases of gangrene following the local application of the drug. Iodoform has produced erythema, vesicles, pustules, and wheals.¹⁰ Phenol and corrosive-sublimate dressings have had similar effects. The prolonged application of weak solutions of phenol is followed occasionally by gangrene.¹¹ Formalin causes vesicular and pustular lesions of the fingers in predisposed individuals. Many of the articles employed therapeutically by the dermatologist should be placed in the same category. Green,¹² of London, reports edema of the skin, followed by desquamation, resulting from the application to it of the ointment of ammoniated mercury in the strength of 2 drachms (8.) to the ounce (30.).

Leszinsky reports a case of dermatitis of the face following the use of a "triple extract of heliotrope" as a toilet-preparation.

An exceedingly common source of dermatitis is urine retained upon underclothing of adults. A persistent dermatitis of the scrotum, the perineum, or the inner faces of the thighs in either sex, always calls

¹ *Dermatitis Venenata*, Boston, 1887; and *Jour. Cut. Dis.*, 1903, **xxi**, p. 441.

² *Deutsche Arch. f. klin. Med.*, **xxxvi**, p. 578.

³ *New York Med. Jour.*, September 12, 1908, p. 506; abstr. *Brit. Jour. Derm.*, 1909, **xxi**, p. 34.

⁴ *Lancet*, April 27, 1912, **clxxxii**, No. 4626; abstr. *Jour. Cut. Dis.*, 1912, **xxx**, p. 576.

⁵ *St. Paul Med. Jour.*, 1912, **xix**, p. 624.

⁶ *Jour. Cut. Dis.*, 1913, **xxxi**, p. 582.

⁷ *Brit. Jour. Derm.*, 1905, **xvii**, p. 447.

⁸ *Jour. Amer. Med. Assoc.*, May 7, 1910.

⁹ *La Presse méd.*, 1901, **liii**, p. 233.

¹⁰ See paper of R. W. Taylor, read before the New York Academy of Medicine, 1887.

¹¹ Harrington, *Amer. Jour. Med. Sci.*, 1900, **cxix**, p. 1 (report of 18 cases and review of 118 cases from literature).

¹² *Brit. Med. Jour.*, 1884, **i**, p. 853.

for examination as to whether a few drops of urine are not left in contact with such underclothing after each act of micturition. Fistulæ, urinary incontinence, prostatic disease, "stammering of the bladder," imperfect finish of the *coup de piston* in men, especially after a gonorrhea and similar troubles, are all to be remembered.

A number of cases of dermatitis have originated in some parts of the Orient from contact with the varnish employed in the finishing of lacquered ware. This lacquer is manufactured from a *rhus* varnish. A few instances of such dermatitis have occurred in America from handling newly imported articles of this class.

Diagnosis.—An acute dermatitis appearing suddenly on regions of the body readily exposed to toxic agents should always arouse suspicion of dermatitis venenata. A history of contact with some irritating substance can usually be obtained. The inflammation in the beginning is limited to the areas with which the toxic agent came in contact, is often asymmetrical, and has no relation to the general health of the patient. The process often reaches the point of greatest intensity within a day or two after its first manifestations, and subsides soon after removal of the cause.

The peculiar features of ivy-poisoning have been described in a monograph on the subject by White,¹ of Boston. According to this author, the lateral surfaces of the digits first exhibit the symptoms of the eruption, later the dorsal surfaces, and latest the thickened palms. The efflorescence also is more irregularly distributed, more uniformly vesicular, and the vesicles are less transparent than in eczema. The lesions, moreover, are more vesicular and less papular at the outset, and, though suggesting papules by their situation in the palm, are in that situation readily made to exude serum by puncture with a needle.

The acute and subacute recurring forms of primrose dermatitis resemble closely similar forms of eczema, a fact to be remembered when seeking the cause of the latter disorder.

Treatment.—Internal medication is not required. The local treatment is that of acute eczema. Black wash (preferably dilute), solution of sugar of lead, or oleated lime-water may be employed at first, and be followed later by dusting-powders. In several instances under our observation a dermatitis due to formalin, and which had resisted other treatment for months, yielded readily to radiotherapy. A number of other cases due to unrecognized agencies have responded equally well to this treatment.

In ivy-poisoning the application of an alkali, for the purpose of neutralizing the poisonous volatile alkaloid in the leaves of the plant (toxicodendric acid, Maisch), should evidently be considered solely with a view to prophylaxis, as it is difficult to understand how such neutralization can control the inflammatory process after its onset. An ointment made by incorporating a decoction of the inner bark of the American spice-bush (*Benzoin odoriferum*) with cold-cream salve

¹ D. Appleton & Co., New York, 1878, from the March number of New York Med. Jour. of the same year.

affords prompt relief in cases in which it is employed, the difficulty lying in securing the bark of the shrub in its young and tender state.

Many topical remedies have been vaunted as specifics for the relief of this disorder, from the brine of a pork-barrel to a decoction of the leaves of the plant itself. As the eruption usually subsides when the skin is protected and not irritated by the local treatment, it is not difficult to explain the result in most cases, though it is possible there is a parasitic or toxic element in the poison. Complete covering of the affected area with flexible collodion frequently is effective, and if applied to the lesions when they first appear often will abort the disease. In later stages care should be taken in opening the vesicles to prevent their contents from coming in contact with unaffected areas of the skin. After emptying the vesicles with a sterile needle, the involved areas may be painted several times with a 50 per cent. solution of ichthyol, and when dry covered with a dusting-powder and light bandage. A calamine lotion, such as the following, has been found of value in most cases due to *rhus* poisoning. One-quarter of 1 per cent. of phenol may be added, if necessary, to control the itching:

R—Pulv. calamin.,	℥iv;	15
Pulv. zinc. oxid.,	℥iv;	15
Glycerin.,	℥ij;	8
Sodii biborat.,	℥ij;	8
Aq. calcis,	q. s. ad. ℥viij;	240

Sodium hyposulphite, 1 drachm (4.) to the ounce (30.), often gives good results when applied as described above or as a wet dressing. Corrosive sublimate lotions; saturated solution of boric acid; carron oil; tincture of iron; bromin, 15 drops (1.) to the ounce (30.) of olive-oil (Brown); dilute nitric acid; sodium bicarbonate; saturated solution of potassium chlorate; and grindelia robusta, 1 drachm (4.) of the fluid extract to 8 ounces (240.) of water, have each been found useful. Foerster¹ recommends the early application of alcohol as efficient in primrose dermatitis.

Prognosis.—While, as a rule, cases of dermatitis venenata recover in a reasonable time, recurrences may happen when the cause again becomes operative; and most important is the fact that occasionally a dermatitis of this type so sensitizes the skin that other irritants of a dissimilar nature may cause a recurrence, until finally a persistent eczema results.

Dermatitis Calorica—Burns.—The action of intense heat from fire, hot steam, boiling water, etc., produces injurious effects upon the skin of varying grades.

Rays of heat and heated objects at a temperature from 125° to 175° F. produce immediately, or after a brief interval, first, an erythema, which disappears when the source of the heat is removed; second, after more prolonged exposure, the symptoms of active inflammation and exudation. Vesicles or bullæ, isolated or confluent according to the

¹ Loc cit.

severity of the cause, may rise from a reddened skin, which is usually intensely painful. These lesions are persistent or are transitory, and are generally filled with a clear serum, which exudes and dries into crusts after rupture of the chamber in which it was imprisoned. At other times the exudation is so abundant that the epidermis rises in broad plates, from beneath which the serum is exuded. This process may terminate by a free production of pus upon the surface and gradual resolution. Adenopathy is a frequent concomitant symptom. In such dermatitis of extensive areas of the skin, the intensity of the process may awaken a violent fever, or death may result from shock or exhaustion.

In yet severer grades there is the production of an eschar, which is dry, brown, blackish, and destitute of all signs of vitality; or, as Kaposi describes it, is dense, coriaceous, and white as alabaster, though upon the eschar some vesicles appear, and by their presence suggest a false conclusion as to the vitality of the tissues upon which they rest. In from eight to ten days the slough is removed by suppurative processes, leaving a granulating surface, which bleeds readily when touched. It is frequently studded with pinhead-sized, white islands, which are points of regenerated epithelium budding from partly destroyed cutaneous glands. These islands of epithelium extend and coalesce, effecting the repair of extensive areas. In such cases the scar which results may consist of penny-sized, circular areas of normal integument, representing these islands, interspersed with scar-tissue. If the destruction of tissue is deeper, granulation and the production of deforming, contracting scar-tissue results. The characteristics of the scar thus produced are: its great irregularity, its tendency to stellate radiation, and the production of ridges, folds, and pockets.

Burns involving one-third of the body-surface are of grave portent, and those affecting one-half the body are generally fatal, even though for from twenty-four to forty-eight hours there may be little complaint of pain. The causes of death in these fatal cases are generally obscure, as the postmortem results are usually negative. Gastric and duodenal ulceration, however, is often recognized. Overheating of the blood, heart-paralysis, oligocythemia, and actual destruction of leukocytes have all been supposed to be effective in bringing about dissolution. In cases in which life is prolonged to the third day, the complications of pyemia, erysipelas, and tetanus may arise. Lastly, exhaustion following fever, suppuration, hemorrhage, and visceral affections may lead to fatal results.

Treatment.—In the treatment of the simplest burns, rest, lotions of lead-water, and cool water, with the application of compresses, are usually sufficient to secure relief; occasionally, dusting-powders may advantageously be substituted. In the cases in which serum is brought rapidly to the surface, with the production of vesicles and bullæ, the latter should be punctured skilfully to give relief to the tension by the evacuation of their contents, but the roof-wall should be preserved, as it may subsequently form an attachment to the exposed derma

beneath. For the relief of the severe pain experienced immediately after the burn, the use of carron oil and bandaging the part had best be employed. In localized cases pieces of linen spread with naftalan ointment and placed over the area give prompt relief, prevent infection, and promote more rapid healing. Where the burn is sufficiently extensive to confine the patient to bed, the open-air treatment may be employed to advantage. Continuous immersion in water having the temperature most agreeable to the patient, as practised by Hebra in cases of severe and extensive burning, produces a speedy and certain amelioration of the pain and a favorable condition of the wounds, though it does not avert a fatal issue in any dangerous case.

The strictest antiseptic precautions are demanded when the suppurative process in the skin is both active and extensive. In some cases disinfection with a 5 per cent. solution of phenol, or a 2 per cent. resorcin solution, should be followed by the application of protective silk wet with a 5 per cent. solution of sodium biborate or bicarbonate, and the whole enveloped either in borax-lint, antiseptic (mercuric iodid) wool, carbolized gauze, or salicylated cotton. Over all, impermeable rubber tissue should be wrapped. Instead of the protective silk, it is often better to use strips of sterile, moist, rubber tissue, $\frac{1}{4}$ of an inch wide. These are laid smoothly and evenly over the surface with narrow spaces between them. The first layer then is crossed by a second at right angles to the first. The surface is thus practically covered with the rubber tissue, leaving, however, at each crossing of the strips small openings for the escape of secretion. Boric-acid water, or other feebly antiseptic solutions, may then be applied and changed as often as necessary without damage to the surface beneath.

Skin-grafting may be required to cover the extensive ulcers left by the larger burns.

Dermatitis Congelationis.—Exposure to extreme cold produces varying grades of inflammation of the parts (usually the ears, nose, cheeks, fingers, and toes), from a comparatively transitory erythema to deep, destructive processes, including gangrene. In the first degree, which usually follows short exposure to extreme cold, there occur erythema and swelling after the parts are warmed. During the freezing process there occurs slight pain, followed by loss of sensation, and the area presents a pale appearance, from contraction of the blood-vessels. As the circulation is restored, hyperemia and edema follow. Occasionally a more or less permanent redness supervenes.

In the second degree the edema and erythema are increased, with the production of vesicles and bullæ. These undergo involution without the formation of scars.

In the third grade gangrene may occur, with and without the formation of bullæ. The frozen part may become insensitive, white, and cold, without the circulation in it of blood- and lymph-currents. From this condition reaction occurs, with the formation of an eschar, differing according to the severity of exposure to cold. If, however, beside the interference with the circulation, the tissue itself has been

destroyed, when reaction occurs the part falls at once into gangrene; or there form bullæ, larger than those described above, filled with sanguinolent serum; or the skin is smooth, marbled with bluish lines, whitish, cold, and insensitive. Gangrene ensues, followed by the well-known phenomena of the "line of demarcation," and, in favorable issues, suppurative separation of the dead part, granulation, repair, and cicatrization. As the injuries induced by congelation are more frequent upon the extremities, the bones, especially those of the digits, largely participate in the losses of tissue. Septicemia and a fatal result may follow.

Treatment.—The temperature should be gradually restored, as rapid warming results in painful and dangerous results from nutritional changes.

In cases of severe congelation the circulation is to be cautiously restored by friction performed in an apartment the air of which is cool, to prevent too energetic reaction. Friction with snow is employed with safety in America and on the steppes of Russia, where these accidents are frequent and are grave in results. Perseverance for hours in this course is often rewarded with success in apparently desperate cases. Antiseptic dressings are usually demanded when sloughing and ulceration ensue; and in severe cases resort to surgical procedures may be necessary.

Dermatitis Medicamentosa.¹—**Synonyms:** Drug Eruptions. Ger., Arzneiexantheme; Fr., Éruptions médicamenteuses.

The importance of recognizing the fact that a given eruption is produced by an ingested drug can scarcely be overestimated from the point of view of the diagnostician. The errors committed in this connection are so frequent and so annoying to the patient that it is necessary for the physician to inquire very carefully, before treating any cutaneous disease, as to the medicaments previously swallowed by the patient, and also to be prompt to connect any aggravation of a cutaneous disease with remedies ordered by himself for internal use. Practically all of the lesions that occur in the various cutaneous diseases, from an evanescent urticarial wheal, or superficial, short-lived macule, to deep-seated ulcerative and gangrenous processes, may be induced by drugs ingested. Every primary and secondary lesion described as symptomatic of cutaneous disease may occur after the ingestion and absorption of different drugs. The difficulty encountered in diagnosis lies in the fact that many different drugs produce identical symptoms; and, again, that a single drug may produce multiform lesions. Arsenic alone may produce nearly all of the various lesions in susceptible subjects. It may be said, then, that with a few exceptions a positive diagnosis as to the exact drug producing a given eruption cannot be made; but this is not of great importance, provided that one is sure that some one of the various drugs is responsible.

¹ For full details and bibliography of this subject, consult the treatise on Drug Eruptions by Prince A. Morrow, New York, 1887; and chapter by Ehrmann in Mraček's *Handbuch*, vol. i, p. 639.

Taken as a whole, drug eruptions have symptoms that are sufficiently characteristic for detection. In this work those eruptions produced by the action of drugs on the skin are described in the chapter devoted to *Dermatitis Venenata*. In this particular chapter only those eruptions produced by the ingestion of drugs will be noted. Some drugs, however, such as belladonna, mercury, etc., produce similar symptoms whether they are applied locally or given internally.

The major portion of drug eruptions are examples of angioneurotic phenomena, and these symptoms may be produced by many drugs, among which are quinin, antipyrin, belladonna, the antitoxins, etc. Only a few drugs, such as the compounds of iodine and bromine, produce characteristic and diagnostic lesions referable without question to the particular drug. Some of the lesions produced by arsenic also are characteristic. While most drugs only exceptionally produce eruptions, others, such as iodine and bromine compounds, commonly do so; and it is only when the rashes occur to an unusual degree, or other manifestations become apparently grave, that special attention is directed to them. Some drugs produce cutaneous symptoms after a single dose, and that may be small; while others do so only after a long-continued demonstration or large dosage; and the most important factor in every case is idiosyncrasy.

While some drugs may produce different cutaneous phenomena in different people, they usually produce a particular eruption in the same individual.

The major portion of eruptions due to the ingestion of drugs are exhibited on the skin as angioneurotic or trophic disturbances, and resemble very much the dermatoses commonly described as due to toxemias inducing the simple and polymorphous erythemas, urticarias, and the more serious trophic disturbances exhibited on the skin as vesicles, bullæ, ulceration, and gangrene.

Symptoms.—As a rule, the eruptions from drugs appear suddenly and disappear soon after the withdrawal of the exciting cause; but the iodine and bromine group are exceptions to this rule. The latter usually appear only after long-continued use or large dosage, and may even appear after the discontinuance of the drug, and they are slow in undergoing involution. Commonly, a drug exanthem is brighter colored than the disease which it simulates, and is usually accompanied by sensations of itching or burning. The iodine and bromine group again are the exception. The eruptions as a class are usually more or less generally distributed and are symmetrical. Special areas, such as the face, neck, forearms (especially about the wrists), and lower limbs (particularly below the knee), are more commonly selected, though a more general distribution may occur. The exanthems of moderate degree are accompanied by mild, if any, constitutional symptoms, but severe symptoms may accompany generalized and intense eruptions. These are especially likely to accompany the scarlatiform and morbilliform varieties.

Etiology.—Drug eruptions occur more commonly in women and children and in people of a neurotic temperament. Lack of proper elimination through disease of the kidneys is also an important factor; but chief of all is idiosyncrasy. Large numbers of cases are seen in which extraordinary susceptibility is demonstrated. Stelwagon¹ reports a case of unusual susceptibility to quinin.

Pathology.—A number of theories have been advanced concerning the pathogenesis of drug eruptions, to all of which legitimate objections can be brought forward and sustained. The fact that idiosyncrasy is the most important factor, and again that eruptions occur most commonly with the drugs that have a special effect upon the nerve-structures, both peripheral and central, makes the neurotic theory advanced by Morrow the most plausible in the majority of instances. It seems that in susceptible individuals the drug circulating in the blood produces irritation of the vasomotor centres of the peripheral nerves, thus inducing all the erythematous, morbilliform, and scarlatiniform eruptions, which are those distinctly angioneurotic or toxic in nature. The more serious lesions which indicate interference with the local nutrition of the skin may be due, similarly, to the more marked effect on the trophic centres which regulate the nutritive processes. The latter is the explanation brought forward in connection with the eruptions induced by the iodids and bromids. Engman and Mook² have recently advanced what they term the rational theory to explain the pathogenesis of these eruptions. They believe that the lesions occur where there is a loss of tissue-equilibrium, due to local congestion already present from an old acne, seborrhea, or trauma, thus causing a more severe local inflammation. But absence of implication of the sebaceous glands and hair-follicles in the process eliminates the theory that excretion of the drug by these avenues induces the eruption.

Diagnosis.—The diagnosis of the various medicinal rashes does not, fortunately, demand a recognition of the essential peculiarities impressed upon each by the exciting cause, since in many cases such peculiarities do not exist. The same drug may, on the one hand, produce a rash with symptoms widely differing in a group of patients; while, on the other hand, the urticariæ resulting from the ingestion of "head-cheese," quinin, and chloral may be indistinguishable. But to establish the fact that a medicamentous eruption is present in any given case is a long step in the direction of reaching the precise cause that has been in that case effective. In general, the medicinal rashes are remarkable for their sudden appearance, their symmetry, their diffusion over large areas of integument, the presence of itching, the absence of fever (exceptions being noted in the eruption produced by such drugs as veronal), and their existence alike upon exposed and protected surfaces of the skin, thus hinting at the action of some cause not operating externally. Excluding syphilis and the exanthematous fevers, a

¹ Jour. Cut. Dis., 1902, xx, p. 13.

² Ibid., 1906, xxiv, p. 502.

generalized rash of sudden occurrence should always raise the suspicion of a dermatitis medicamentosa. Similarly, in cases of preëxisting disease—syphilis, eczema, or psoriasis—the sudden occurrence of lesions of a new type, widely diffused, or of rapid aggravation *in situ*, or of speedy extension in the area of those already in existence, should awaken the suspicion, if there be fever, of the exanthemata, and, without a febrile process, of the medicinal rashes. It is a matter of common experience, when examining patients on the eve of a macular syphiloderm, or even long past the eruptive stage of the disease, to see their faces, necks, and shoulders covered with an acneiform rash produced by potassium iodid. The practitioner cannot too strongly be urged to view with exceeding watchfulness the skin of a patient affected with any of the common disorders (eczema, acne, and psoriasis) when the eruption becomes anomalous as to type, distribution, or symptoms.

Treatment.—In the major portion of cases, it is only necessary to terminate the use of the drug, when recovery soon follows. In the more serious iodine and bromine eruptions, eliminative treatment is important, and a local dressing of salicylic acid or ammoniated mercury hastens recovery. Crocker recommends small doses of arsenic to hasten the slow involution of the large plaques occurring with these drugs. Arsenic is also of value in preventing the unsightly acneiform lesions occurring in patients to whom the iodids must be given in certain stages of syphilis.

The following is but an imperfect list of the drugs the internal administration of which may be followed by an exanthem; imperfect, because without question many have yet to be recognized as possessing such an action. For convenience they are arranged in alphabetical order.

Acids capable of producing macules, papules, erythema, and desquamation, are nitric, tannic, benzoic (and sodium benzoate), and boric (and sodium borate).

Aconite is said to be productive at certain times of marked diaphoresis, with the occurrence of vesiculation and considerable itching. The diaphoresis in an irritable skin may be responsible for the trouble.

Antifebrin and Acetanilid occasionally produce an erythematous or maculo-papular exanthem, or, when long continued, may cause partial cyanosis.

Antipyrin and Other Remedies of its Class (manufactured by the action of glacial acetic acid upon the petroleum products).—Ernst¹ has been followed by many observers in recording rashes resulting from the administration of antipyrin. The symptoms are discrete and confluent patches of bright-red, scarlatiniform, erythematous, and pruritic macules or papules. Veiel² reports edema with bullæ upon the lips and toes and over the palate, with urticarial lesions of the palms and soles, after ingestion of antipyrin. Brocq, Darier, and others have reported cases in which antipyrin has produced a more or less persistent erythema in the form of isolated, scattered, sharply

¹ Centrabl. f. klin. Med., 1885.

² Archiv, 1891, xxiii, p. 33.

defined plaques. These plaques are usually few in number, and they tend to return in the same sites whenever the susceptible individual ingests the drug. The redness and pigmentation may persist for several weeks. Wickham¹ reports an antipyrin rash which simulated perfectly a macular syphiloderm.

Antitoxin.—(See Serum Eruptions.)

FIG. 57



Generalized pigmentation and keratosis following long-continued use of arsenic.

Arsenic.²—Erythematous, vesicular, papular, and, much more rarely pustular, bullous, and ulcerative lesions occur upon the face, the back, and the hands after the ingestion of arsenic. The well-known effects of the administration of the drug in toxic doses upon the mucous membranes of the eyes, nose, and mouth need not be described in this con-

¹ Berliner Monatshefte, 1902, xxxv, p. 137 (with review of literature).

² Brooke-Roberts: The Action of Arsenic on the Skin, as Observed in the Recent Epidemic of Arsenical Beer-poisoning, Brit. Jour. Derm., 1901, xiii, p. 121.

nection, nor yet the grave gangrenous symptoms, with osseous necrosis, that have been observed in workers in the metal.

"A bright-red, scarlatiniform blush, with a few isolated vesicles, has covered both shoulders of a young woman with a delicate skin after taking three medicinal doses of Fowler's solution, the eruption being present, but less distinct, upon her face and hands. In two cases the rash in polymorphic type was limited to the hands alone" (Hyde).

Young patients who have taken arsenic in the largest medicinal doses for relief of chorea often present as a result a dark discoloration chiefly of the skin of the chest and the neck, but also of other parts of the body. This discoloration is suggestive of the bronzing seen in Addison's disease. In some instances there are no other cutaneous symptoms. Guaita and Liège¹ noted these phenomena usually in the fifth month after ingestion of the drug.

Long-continued use of arsenic may produce keratosis of the palms and soles of severe grade, obstinate character, and occasionally grave results. Administered for relief of psoriasis, the resulting keratoses have later developed into epitheliomata of malignant type.²

By far the larger number of rashes are, however, produced in persons previously suffering from the cutaneous disease for the relief of which the drug is administered. Here the toxic effect is declared by: first, increased hyperemia of the skin, visible in an erythematous patch, or beneath the scales of a squamous patch, or as an areola of bright-red hue about any aggregation of lesions; second, by simple aggravation of the type of a disease already in existence (recurrence of acuity in a subacute eczema); third, by rapid peripheral extension of a disease which had previously been well limited in contour; or, fourth, by converting a disease exhibiting uniformity of lesions into one characterized by multiformity. Each of these results might be illustrated by cases.

In a series of eight cases of poisonous effects produced by arsenical paper-hangings, and reported by Brown,³ there were, curiously, no cutaneous symptoms.

Aspirin induced an angioneurotic eruption in two cases recorded by Anderson.⁴

Belladonna.—The well-known erythematous, scarlatiniform or reddish efflorescence produced by belladonna and its alkaloids is usually limited to the upper segment of the body, but it may become generalized. It is said to occur more frequently in children, probably because belladonna has been administered largely to individuals of that age under the delusion that it is useful as a prophylactic in scarlatina. Very disagreeable and even dangerous results have followed the instil-

¹ Hamburger: Arsenical Pigmentation and Keratosis, *Johns Hopkins Hosp. Bull.*, 1900, xi, p. 87.

² Hartzell, *Amer. Jour. Med. Sci.*, 1899, cxviii, p. 265; and Darier, *Annales*, 1902, iii, p. 1126.

³ Paper read before the Boston Society for Medical Observation, March 6, 1876.

⁴ *Canadian Practitioner and Review*, September, 1912, xxxvii, No. 9; *abstr. Jour. Cut. Dis.*, 1912, xxx, p. 754.

lation into the eye of atropin as a mydriatic, the rash being accompanied by constitutional symptoms.

Boric Acid.¹—Erythema, papules, vesicles, bullæ, and lesions resembling those of erythema multiforme (Fordyce) are reported as following the ingestion, or absorption, of boric acid. A mild form of acute exfoliative dermatitis, with temporary loss of hair, is recorded as occurring after prolonged use of the remedy.

Modadewkow reports a case in which the pleura was washed out with a 5 per cent. solution of boric acid, a part of which was not removed. There occurred as a result an erythematous rash over the face, the trunk, and the extremities.

FIG. 58



Dermatitis medicamentosa. (Howard Fox.)

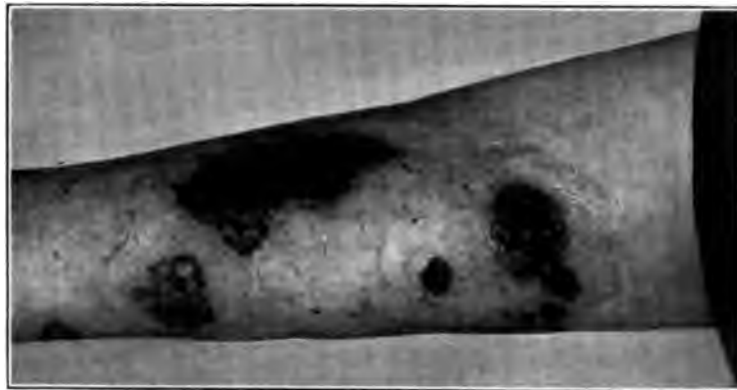
Bromin and its Compounds.—A full account of the cutaneous effects of bromin and its compounds, when administered internally, is contained in a paper on medicinal eruptions, read in 1880, by Van Harlingen, of Philadelphia, before the American Dermatological Association. Acneiform lesions, pustules, macules, maculo-papules, papules, eczema-form moist patches, furuncles, urticarial wheals, scales, and ulcers have been induced by swallowing the bromids of potassium, sodium,

¹ Wild, *Lancet*, 1899, i, p. 23 (with bibliography).

ammonium, and lithium. By far the commonest are the acneiform and pustular lesions, occasionally accompanied by itching, which appear upon the face and the upper portion of the trunk, though the rash may be very distinct upon the genital region. Duhring reports an interesting observation of a patient in whom the eruption simulated closely the maculo-papular syphiloderm, the patient having taken a bromin salt for three years. The eruption first appeared within five or six days after decreasing the dose. Kaposi observed a case of bromid-rash in a nine-months-old suckling, the mother having taken 120 grammes of potassium bromid in two months, without exhibiting traces of eruption.

A remarkably characteristic exanthem is produced by the administration of potassium bromid, especially to infants and young children.

FIG. 59



Dermatitis medicamentosa due to bromids.

The lesions are condylomaform, quite numerous, and conspicuous about the face and neck, where they are packed closely together, but they are also seen on other parts of the body. The small-coin- to nut-sized elevated nodules are usually flattened; and they often resemble carbuncles, as they have a cribriform summit, on which multiple points of imprisoned pus are visible. This rash, though rare, has been carefully studied and well illustrated by chromo-lithographic reproductions.

Recent literature is replete with reports of examples of vegetating, tuberos, papilliform, and fungoid lesions produced by the ingestion of the bromids. Kudisch,¹ Versilovoi,² Pospelov,³ Whitehouse,⁴

¹ Zeitschrift, 1912, xix, p. 713; abstr. Jour. Cut. Dis., 1913, xxxi, p. 281.

² Russki Joornal Kojnikh E Venericheskikh Boleznei, April, 1913, No. 4, p. 311; abstr. Jour. Cut. Dis., 1913, xxxi, p. 1061.

³ Ibid., March, 1913, No. 3, p. 200; abstr. ibid., p. 1060.

⁴ Jour. Cut. Dis., 1913, xxxi, p. 497.

Oulmann,¹ Burns,² and many others have described cases representing these varieties. One of the authors³ reported a group of this type resembling blastomycosis. Stelwagon and Gaskill⁴ reported a similar case. A further report of the same case is made by Gaskill.⁵

T. C. Fox and Gibbes report these condylomaform nodules in the case of an infant, in which the histology of the lesions was carefully studied; and Fay, in a child eleven months old, also recognized an exanthem which had been mistaken for molluscum epitheliale. These lesions are somewhat similar to the condylomaform rash seen in children after the administration of potassium iodid. The lesions may appear for some weeks after the drug has been discontinued.

Browse, of Cambridge, England, recommends for relief of these symptoms the application of a solution of salicylic acid, 1 grain to the ounce (0.066-30.) of water, frequently applied on lint, he having successfully treated in this way sores as large as the palm of the hand.

Cannabis Indica.—An eruption produced by the ingestion of this drug was observed by Dr. Hyde⁶ in the case of an adult male, who was covered extensively with papulo-vesicular lesions after swallowing 1 grain (0.066) of the extract.

Cantharides.—Erythematous and papular eruptions are reported in a few instances.

Capsicum.—Erythema results occasionally. Allen reports a papulo-vesicular eruption following the internal use of the drug.

Chloral.—An erythematous rash is the commonest of the eruptions produced by chloral, though wheals, red and yellowish papules, vesicles, pustules, and petechial blotches have been observed. The rash occurs upon the face, the neck, the trunk, and the limbs, of the latter especially on the extensor surfaces. In a man of advanced years and totally deaf, who had slept only under the influence of chloral for four years, discrete scaly patches as large as saucers covered the hands and the lower extremities.

Martinet⁷ reports an erythematous and scarlatiniform rash, occasionally commingled with urticarial and purpuric lesions, occurring upon the face and neck, the front of the chest, the extensor surfaces of the larger joints, and the dorsum of the hands and feet. There was no pyrexia or indisposition, but in some cases there were dyspnea and cardiac palpitation.

Chloralamid.—Pye-Smith reports a case in which this drug produced a scarlatiniform eruption, involving the mucous membranes, accompanied by fever, and terminating in free desquamation.

Chloroform.—During inhalation an erythema of short duration, and, rarely, purpuric spots are noted.

Cod-liver Oil.—According to Farquharson, cod-liver oil after being swallowed is capable of producing an acne. This result is traceable to inferior qualities of the oil.

¹ Jour. Cut. Dis., 1911, xxix, p. 239.

² Ibid., 1909, xxvii, p. 445.

³ Jour. Amer. Med. Assoc., 1914, lxiii, p. 912.

⁴ New York Med. Record, May 11, 1878.

⁵ Ibid., p. 35.

⁶ Ibid., 1913, xxxi, p. 429 1.

⁷ Thèse de Paris, 1879.

Condurango.—Guntz¹ reports the occurrence of furuncular and acneiform lesions in twenty patients out of one thousand who were taking condurango for the relief of syphilis.

Copaiba and Cubebs.—Occasionally, the ingestion of copaiba is followed by a vividly red rash, in the form of discrete macules, more rarely maculo-papules, invading chiefly the lower segments of the extremities and the skin of the abdomen, but often completely covering the body-surface. The rash may occur in dark, mulberry-red petechiæ, and always is accompanied by itching. Inasmuch as the drug often is administered for the relief of a venereal disorder not syphilitic, care should be taken not to confound the eruption it may excite with the early macular syphiloderm. Cubebs is followed much more rarely by a similar result.

Digitalis.—In Behrend's treatise on *Diseases of the Skin*² reference is made to cases in which macular and maculo-papular rashes succeeded the ingestion of digitalis.

Ergot rarely gives rise to vesicles, pustules, small furuncles, or petechiæ. Circumscribed areas of gangrene on the extremities are more common.

Eucalyptus produced an eruption of bright-red, cherry-red, and brownish-red papules and nodules, mostly circumscribed, but confluent on toes and fingers, in a case reported by Oppenheim.³ The lesions were situated on the hands and feet chiefly, and were accompanied by slight itching and preceded by mild general symptoms.

Fibrolysin injections producing a general erythema are recorded by Tausard and Raillet.⁴

Guaiacum produced a general eruption of large, elevated, erythematous plaques in a case recorded by Kingsbury.⁵

Iodin and its Compounds.⁶—Potassium iodid is responsible for the larger number of all eruptions among medicinal rashes. The frequent employment of this drug and the very marked influence it possesses over the skin render the study of these morbid results important. Unlike many of the other substances in the list of drugs, the iodine compounds are followed by some species of rash in probably the larger number of all persons who swallow them. As is true also with the bromine compounds, the eruption may persist, or even first appear, after the drug has been discontinued.

The resulting lesions may be macular, papular, vesicular, bullous, pustular, petechial, multiform, or may be circumscribed subcutaneous abscesses. In appearance the rashes produced by iodine and its compounds may simulate those of every other dermatitis.

¹ Vierteljahr, 1882, ix.

² Braunschweig, 1879.

³ Derm. Wochenschrift, 1912, liv, p. 224; abstr. Jour. Cut. Dis., 1912, xxx, p. 304.

⁴ Bull. Soc. Fr. de Derm. et de Syph., 1908, p. 83; abstr. Jour. Cut. Dis., 1909, xxvii, p. 44.

⁵ Jour. Cut. Dis., 1912, xxx, p. 214.

⁶ D. W. Montgomery, Trans. Med. Soc. of State of Cal., 1900 (review of subject with bibliography); and Rosenthal, Archiv, 1901, lvii, p. 3 (review of subject, with account histological changes in one case).

The macular rash is seen best fully developed over the upper extremities in discrete erythematous patches or as a diffuse blush. Generally the rash is displayed symmetrically. The hands are often affected, and suggest in appearance the hands of the anilin-worker. The rash assumes at times the papular type, with special production of papules upon the face.

Berenguer describes a scarlatiniform rash of sudden occurrence, with numerous minute, discrete vesicles upon the surface of the skin. Eczemaform eruptions with abundant serous exudation are also reported.

A number of cases are on record in which the administration of the drug was followed by the production of bullæ. Bumstead, Taylor, Duhring, Tilbury Fox, Finny, and one of the authors have described such bullæ in adults as well as in children.¹ Hallopeau² also reports a fatal case in which a bullous eruption followed the ingestion of potassium iodid. The eruption occurred chiefly about the head and neck and the upper extremities. The significant rarity of vesicular and bullous lesions in acquired syphilis suggests that at least some of the cases of this condition on record were those of rashes induced by the remedy given for the relief of the disease.

A careful analysis of these bullous rashes leads to their division into three categories: first, those occurring, often with fatal results, in cachectic adult patients; second, those occurring as part of the eruptive lesions in a polymorphic group; third, those occurring in well-nourished children, and taking on the appearance of molluscum epitheliale and condyloma-lesions, usually compounded of papulo-vesicles and pustules. Erythemata of a similar type have also been recognized after the ingestion of potassium bromid by infants.

The pustules induced by the administration of iodine compounds are seen chiefly upon the face, the neck, the trunk, and the arms. They are usually seated upon a firm base, and may be followed by cicatrices. Duhring has seen an annular patch upon the forehead, made up of minute vesico-pustules, which eventually developed into a globular, violaceous mass nearly two inches in diameter. Large, cherry-sized, tubercular or papillomatous elevations, abruptly rising from the surface of the integument, may present a cribriform structure, which shows the open ducts of several suppurating follicles (chin, cheek, nose). A few cases are reported in which fungating tumors were found, producing an appearance almost identical with that of mycosis fungoides. Neumann³ calls attention to the fact that these severe forms of iodid-eruption occur in patients suffering from albuminuria.

The purpuric rash occurs in petechial macules, discrete and miliary, situated chiefly on the lower extremities. In a case reported by Mackenzie (quoted by Van Harlingen) a dose of $2\frac{1}{2}$ grains (0.166) taken by an infant was followed by a fatal result after petechiæ appeared.

¹ Jour. Cut. Dis., 1886, iv, p. 383.

² Union méd., 1882, xxx, p. 481.

³ Archiv., 1899, xlviii, p. 323.

Iodoform.—The internal administration, or the absorption through wounds, of this drug has been followed by macular, papular, vesicular, bullous, petechial, and mixed eruptions. Grave, and even fatal, systemic results are noted, including fever, delirium, emaciation, and nephritis. (For the local effects of the drug, see *Dermatitis Venenata*).

Jaborandi and Pilocarpin are capable, when ingested, of inducing free diaphoresis; erythematous macules, wheals, and pinhead-sized papules have been seen upon the surface as a result.

Mercury.—Mercury, when ingested, is reported to have produced an erythematous rash upon the surface of the skin. In view of the fact that the metal has been, in its various compounds, administered for so long a period of time and for so many various diseases without the production of cutaneous symptoms, it is a fair hypothesis that in the few reported cases there was coincidence rather than causation. Mercurials, when applied to the external surface of the body, are, as is well known, capable of exciting in various degrees cutaneous irritation and inflammation.

Midal, a substance containing pyramidon, produced erythema, wheals, and purpuric lesions on the legs, accompanied by itching, in a case recorded by Bechet.¹

Opium and its Alkaloids.—Erythema, wheals, and occasionally intense itching, with edema and subsequent desquamation, have followed the ingestion of opium and several of its alkaloids, notably morphin. In its mildest expression, this cutaneous effect is limited to a characteristic itching about the nostrils, that can be perceived in a large proportion of all patients as soon as the general effect of the opiate becomes apparent. In some patients there may follow an intense and distressing general pruritus without efflorescence, and it is certain that the subsequent urticarial efflorescence is caused by the free diaphoresis which the medicament induces. The fact is a matter of practical moment, as the use of an anodyne for the purpose of procuring sleep for a patient tormented with a nocturnal pruritus would seem to be occasionally indicated. Inasmuch as chloral, potassium bromid, and the opiates are all capable of aggravating such distress, great caution is needful in such emergencies. In general, it may be said that the employment of these and similar remedies for the relief of pruritus should be interpreted as a confession of weakness on the part of the physician, who ought to be able to alleviate the distress of his patient by a judicious employment of topical remedies.

Petroleum and its products are responsible for a large list of medicamentous rashes (see Antipyrin).

Phosphorus.—Hasse (quoted by Van Harlingen) cites the case of a young girl who exhibited a pemphigoid rash after the ingestion of phosphoric acid. According to Farquharson, phosphorus itself is occasionally responsible for purpura, with gastro-intestinal derangement and jaundice preceding a fatal issue.

¹ Jour. Amer. Med. Assoc., 1912, lix, p. 1289.

Podophyllin.—Winterburn¹ reports that those who work in resinoid podophyllin are liable to suffer, as a consequence of this exposure, from a cutaneous disease of the scrotum.

Potassium Chlorate.—Stelwagon and others report that papules and macules have followed the use of this remedy, administered in the form of tablets.

Quinin, Cinchona, and Cinchona Alkaloids.—Morrow² collected the records of over sixty cases of quinin-exanthem, and showed that its prevailing type is exanthematous, the rash being of a vivid hue, disappearing on pressure, and resembling scarlatina. Other lesions produced are wheals, papules, vesicles, petechiæ, hemorrhagic purpura, bullæ, and in one instance an intense localized dermatitis, with beginning gangrene, of the scrotum. Bullous formation is rare following ingestion of quinin. Trimble³ reports an example of this form. In some of the cases the rash appears on repetition of the dose, and even after recourse to other alkaloids. The subjects are mostly women. As with most of the other exanthem-producing drugs, small doses suffice for the effect where the idiosyncrasy exists. The rash has been studied in an adult male, who, after taking 2 grains (0.133) of quinin sulphate for the first time in six years, exhibited an efflorescence (over the entire surface of the body) of discrete, finger-nail-sized, salmon- and pinkish-tinted, scarcely elevated patches, accompanied by moderate itching. A repetition of the dose was followed by a recurrence of the exanthem.

In several cases desquamation is reported as resulting from the rash. As to the occurrence of the general symptoms recognized under the title "cinchonism" (*tinnitus aurium*, etc.), these may and may not accompany the lesions. Morrow makes the pertinent suggestion, in view of the frequent similarity of the rash to that exhibited in scarlatina, that many cases hitherto recorded as recurrent attacks of that disease and measles, with other anomalous cutaneous eruptions, may have been instances of quinin-exanthem.

Salicylic Acid and the Salicylates.—Reports of cases in which these substances after ingestion produced cutaneous symptoms have been made by Heinlein, Wheeler, and Freudenberg, all cited by Van Harlingen. The symptoms were diffused redness, urticarial lesions, vesicles, pustules, petechiæ, and vibices, accompanied by intense itching and followed by desquamation. Engman⁴ reports an interesting case, including the histology of the lesions.

Salipyrin.—Edema of the skin and actual loss of tissue have resulted from the administration of gramme doses of salipyrin to a man aged fifty-four years (Schmeyer).

Salvarsan.—Salvarsan and neosalvarsan may produce a variety of eruptions, the most common forms being an urticarial erythema and urticaria. Occasionally, a scarlatiniform or morbilliform erythema,

¹ Louisville Med. News, 1882, xiii, p. 187.

² New York Med. Jour., 1880, xxi, p. 244.

³ Jour. Cut. Dis., 1910, xxviii, p. 194.

⁴ Ibid., 1899, xvii, p. 555.

bullous and vesicular lesions, and, rarely, gangrene, may follow their use.

Santonin.—A generalized eruption of urticarial lesions seated upon a reddened surface and accompanied by edema is reported by Sieveking as occurring in a child to whom santonin has been administered as a vermifuge.¹

Serum Eruptions.²—Tuberculin, diphtheria-antitoxin, and the various vaccines used as therapeutic measures frequently produce in susceptible individuals cutaneous exanthems. As the antitoxin of diphtheria is used so commonly today, the exanthems produced by its employment should be recognized.

Frequency.—Owing to the fact that different serums produce eruptions in varying proportions, and also to the fact that accurate records are kept chiefly in hospitals, where the injections are used as a routine measure, and also by a few men specially interested in the matter, the exact proportion of persons displaying eruptions in relation to the whole number treated is difficult to determine. Hartung collected data from the literature on the subject, and from the reports of twelve observers found 294 eruptions resulting from 2661 injections, an average of 11.4 per cent.

Date.—The appearance of these eruptions may occur from one to thirty days after the injection. The majority appear from the sixth to the tenth day.

Character.—The important exanthems in the order of frequency of occurrence are the following: urticarial, polymorphous, erythematous, scarlatiniform, morbilliform, vesicular and bullous, and purpuric. The last three are rare. The majority are urticarial, and may be ordinary urticarial wheals or urticarial erythema. The scarlatiniform and morbilliform varieties closely resemble the disease after which they are named. Mixed types are common and aid in diagnosis. Edema, especially of the face, about the eyelids, also of the penis, scrotum, and feet, is not infrequently noted in association with these eruptions. The distribution of the lesions is irregular. While they may occur on any part of the cutaneous surface, the sites of predilection are about the arms, legs, buttocks, and trunk. The face occasionally may be attacked. The first appearance of the eruption is commonly about the site of injection. It is frequently noted that the eruption appears within twenty-four hours at the site of the injection and soon clears but reappears later generalized. The extent of the eruption varies from a few isolated, scattered patches to a profuse exanthem, involving almost the entire cutaneous surface. Its duration is commonly about two days, but it may persist for three, four or five. Purpuric lesions naturally persist for a longer period. The eruption may recur within a few days after disappearance, or after some weeks. The dates of recurrence vary from three to seventeen days. More than one recurrence may happen.

¹ Brit. Med. Jour., February 18, 1871.

² Welch and Schamberg, *Treatise: Acute Contagious Diseases*, pp. 754-760.

These rashes are commonly accompanied by constitutional disturbance of varying degree. There is usually a rise in temperature, with its accompanying symptoms. While this rise usually does not exceed 101° to 102° , it may be as high as 105° . The fever lasts from one to three days, subsiding with the disappearance of the eruption. Head-ache, a certain amount of prostration, and arthralgia are common accompaniments. The joint-pains are valuable aids in diagnosis.

It is believed that these cutaneous manifestations are induced by the serum *per se*, and that the antitoxic material has little to do with their production. Similar eruptions have been produced repeatedly by non-immunized serum.

Sodium Benzoate.—Rohé¹ reports two cases in which an erythematous rash, with well-defined border, accompanied by itching and slight desquamation, occurred during the use of sodium benzoate. The patients were a woman, aged thirty-five years, and a boy suffering from diphtheria. The eruption disappeared on discontinuance of the remedy, and was made successively to appear and disappear by its alternate use and disuse.

Sodium Biborate.—Gowers² reports the occurrence, especially on the arms, but also over the trunk and legs, of an eruption resembling psoriasis, after the ingestion of sodium biborate. Some of the resulting patches were one and a half inches in diameter. Three cases in all are collated. In two the eruption faded when a solution of arsenic was added to the sodium salt.

Stramonium.—Deschamps³ reports an erythematous rash after the administration of the thorn-apple.

Strychnin.—Skinner (cited by Van Harlingen) reports a case in which an eruption of six weeks' duration ensued upon the administration of quinin and strychnin together; the former in the dose of $1\frac{1}{2}$ grain (0.1), the latter in the dose of $\frac{1}{4}$ grain (0.0025).

Sulphonal.—Diffuse macular and scarlatiniform eruptions are seen occasionally. Vesicular and purpuric lesions have also been reported.

Tanacetum.—A case of varioliform eruption produced by the ingestion of $1\frac{1}{2}$ drachms (6.) of the oil of tansy, administered for abortifacient purposes, is reported by Potter.⁴ There were antecedent clonic convulsions. The result was not fatal.

Tar and Turpentine.—Erythematous, vesicular, and papular rashes are reported as resulting from the ingestion of these substances.

Veronal.—Wills,⁵ House,⁶ Bulkley,⁷ Wooley,⁸ and others have reported instances of eruptions produced by this drug. Their occurrence is due to idiosyncrasy, and the lesions belong to the group of the angioneurotic dermatoses. They may be exhibited as local or general

¹ Maryland Med. Jour., 1881, viii, p. 91.

² Lancet, 1881, ii, p. 546.

³ Cited by Duhring.

⁴ New England Med. Jour., October 15, 1881.

⁵ Brit. Med. Jour., March 3, 1906.

⁶ Jour. Amer. Med. Assoc., 1907, xlviii, p. 1349.

⁷ Ibid., 1907, xlviii, p. 1865.

⁸ Ibid., 1907, xlix, p. 2153.

exanthems. Erythema, large maculo-papules, vesicles, oval and circinate patches with dark centres resembling insect-bites, scarlatiniform erythema, and edema, especially of the face, have been described. On clearing, brownish stains and petechial spots remained for a time. Constitutional symptoms of moderate grade accompanied the general eruption. Pollitzer¹ recorded a case with erosive lesions in the mouth and about the anal region, accompanied by systemic symptoms, including urinary changes. The author has recently seen a similar example. The patient had been in the hospital for some weeks suffering with psychosis and had been given 5 grains of veronal each evening. The eruption had a generalized distribution and appeared first on the extremities. The face was red, swollen, and edematous. The eruption on the arms and trunk was morbilliform in character, in certain areas large plaques being present in addition. Intense itching accompanied the eruption. The temperature ranged from 100° to 103° for several days. The process subsided in about eight days.

The following medicaments may be added to the list of drugs capable of producing rashes when administered by the mouth:

Anacardium, alcohol, bitter almonds, antimony, argenti nitras, benzol, chinolin, bitter-sweet, capsicum, duboisin, ferrous iodid, guarana, kava-kava, creosote, resin, castor-oil, ipecacuana, hyoscyamus, lactophenin, matico, lead and its compounds, mesotan, sulphur and calcium sulphide, veratrum viride, cocain, conium, pimpinella, rhubarb, and valerian.

Many of these drugs have been effective in but few instances. There is no reason why the list should not in the future be greatly enlarged, as it is probable that every medicament is capable of producing a temporary efflorescence when the system exhibits a special sensitiveness to its action, the character of the eruption depending largely on individual idiosyncrasies, and on the circumstances (including the condition of the tissues) attending the administration of the drug.

Feigned Eruptions.—**Synonyms:** Dermatitis Factitia, Hysterical Dermato-neuroses, Hysterical Gangrene, Neurotic Gangrene, Spontaneous Gangrene, Erythema Gangrenosum.

Definition.—Feigned eruptions occur in all degrees of dermatitis, from a simple erythema of a few days' duration to the various vesicular, bullous, gangrenous, and ulcerating lesions. The mild and superficial forms are the more common, but superficial gangrene and ulcers are not infrequently seen. The degree and severity of the process depend not only upon the agent employed, but also upon the strength of the solution, the duration of the application, and the susceptibility of the tissues to which the agent is applied. Thus, a moderately weak solution of phenol, if applied for a few minutes only, will produce in most individuals an erythema or superficial dermatitis of a few days' duration. If the solution be stronger, or if a weaker solution be allowed to remain in contact with the skin longer, severer forms of inflammation and even gangrene may result.

¹ Jour. Cut. Dis., 1912, xxx, p. 185 (with additional literature).

PLATE IV



Dermatitis Factitia.

The methods employed in the production of these lesions are varied and often difficult to detect. Many different animal, vegetable, and mineral substances have been used for the purpose. Among those most commonly employed may be mentioned carbolic acid, croton-oil, Spanish fly, mustard, various acids and caustics, lye, and cresoline. Other methods include burning with hot-water bottles, matches, hot metal; and friction with the finger, pieces of wood, or other rough material.

Occasionally, a skilled malingerer succeeds in imitating more or less closely certain definite cutaneous disorders. Among those so imitated may be named sycosis, favus, alopecia, ringworm, scabies, bromidrosis, hemidrosis, chromidrosis, erysipelas, abscesses, and syphilis. Patients with an eczema or other cutaneous disorder may aggravate or prolong the same and make the interference very difficult of detection, even while under treatment.

Diagnosis.—The diagnosis of feigned eruptions is usually not difficult for one familiar with cutaneous diseases, as the lesions do not correspond with those of any recognized disorder. As a rule, the lesions all occur within easy reach of the patient's hands, and are most numerous on the anterior surfaces of the body; on the left arm, forearm, and hand; the lower extremities; and right side of the face and neck; that is, all regions easily reached by the right hand. In case of a left-handed individual, the regions most accessible to that hand would, of course, show the largest number of lesions. The palms, soles, eyelids, mouth, nose, ears, scalp, and genitals are usually spared.

The lesions are always sharply outlined and of unusual, often fantastic, shapes. They appear suddenly, at irregular intervals, usually one or two at a time, and run a fairly rapid course. When fluid caustic is used, it frequently happens that one or more drops run down the skin from the point of application, leaving a characteristic streak, which is usually lighter in color and shows a less degree of inflammation than the patch from which it depends. When the caustic is applied with a needle or pin, as is frequently the case in gangrenous areas, the border shows an irregular, finely jagged or serrated (saw-tooth) edge, made by the numerous punctures in the advancing border. When gangrene is present, it is usually very superficial, and separated from the normal skin by a narrow, vivid-red line. The fingers, nails, or some article of the clothing are often stained by the agent employed.

Subjective sensations, usually pain and burning, may be greatly exaggerated by the patient, who will then cringe or jump at the slightest touch during the examination and will complain bitterly of the distress caused by the simplest and lightest of dressings. On the other hand, the areas may be largely anesthetic, and some of these individuals like to exhibit their ability to endure pain. Many of the patients enjoy mystifying their medical attendant by predicting from twelve to twenty-four hours in advance the exact areas upon which new lesions will occur, claiming that during this period they experience in these areas a sense of heat and burning and other queer sensations.

Further aids to diagnosis may be found in the general characteristics of the patients; the unusual history of the disorder; the discovery of anesthetic areas, especially of the fauces and conjunctiva; and other evidences of hysteria. Finally, if necessary, a fixed dressing that cannot be removed without detection may be used to clear the diagnosis.

The patients presenting feigned eruptions may be roughly divided into two classes: First, deliberate malingerers, such as criminals, soldiers, sailors, and others desiring to escape punishment or service; servants, nurses, and those desirous of avoiding disagreeable duties or surroundings; and paupers or mendicants seeking charity, hospital accommodations, or other assistance. Second, hysterical and neurotic individuals, chiefly women and girls, who inflict these injuries upon themselves for reasons not always definitely recognized. With this class of patients, there is frequently a desire, more or less defi-

FIG. 60



Dermatitis factitia, produced by potassium hydrate. (Foerster.)

nately recognized by the patient, to escape from disagreeable duties or surroundings, to gain attention, sympathy, interest or pity, or to achieve notoriety. The sexual element is not infrequently present. Awakening sexual desire, possibly not definitely recognized, in the developing girl; excessive or abnormal sexual activity; orgasm induced by torturing the skin; and a certain satisfaction experienced through exposing the body for examination, are features recognized in some of these cases. In some instances, the patient, while not recognizing any motive, states that she is subject at times to sudden irresistible impulses to produce these lesions. Such impulses may be the result of "suggestion" or of the "fixed idea." In a large proportion of cases the factitious eruption is preceded by some light wound or abrasion of the skin to which an antiseptic dressing has been applied. The patient is thus provided not only with a source for the suggestion but

also with the means for carrying it out. The extent to which hysterical young women will injure themselves is illustrated in two of the author's patients, both of whom submitted to amputation of the fingers, and one demanded amputation of the entire hand, for gangrene produced by themselves with carbolic acid.

Treatment.—The chief object to be attained for relief of these patients is to induce them to acknowledge the facts. New lesions then cease to appear and the management of existing lesions should be in accordance with the rules laid down in the chapter on Dermatitis.

X-ray Dermatitis.—The symptomatology, etiology, and pathology of x-ray dermatitis are considered under Radiotherapy.

Treatment.—A better understanding of the possibilities of the x-rays has developed a technique the careful following of which should prevent severe x-ray burns, except in rare instances where it is thought

FIG. 61



Radio-dermatitis, third degree, upon keratoderma.

advisable to risk the danger of such a burn for the sake of quickly destroying a rapidly progressing malignant growth. Even the mild forms of x-ray dermatitis can usually be avoided by the exercise of proper skill and care.

The simpler forms of dermatitis due to x-rays may often be treated successfully with the measures recommended for corresponding phases of eczema and dermatitis due to other external causes. Frequently, however, even a mild dermatitis due to x-rays is persistent and exceedingly painful, and not infrequently is aggravated rather than relieved by measures applicable to corresponding grades of dermatitis from other causes. In such cases various applications, with or without some local anodyne, may be tried. Among those we have found the most useful are the following: the lead and opium wash, with or with-

out the addition of a powder, glycerin, or boric acid, as recommended for the treatment of acute eczema; a mixture of equal parts of this lotion and carron oil (made with olive oil); compound stearate of zinc powder; a simple ointment containing one or two drachms of orthoform to the ounce. We have found the following paste, recommended by Engman,¹ very satisfactory:

Boric acid, 12 drachms (48.); zinc oxid, starch, bismuth subnitrate, and oleum olivæ, of each 1 ounce (30.); liquor calcis and lanolin, of each 3 ounces (90.); rosewater 12 drachms (48.). The powder should be well rubbed up in a mortar and the lanolin added; the olive oil and liquor calcis then are mixed and slowly added. When this is mixed thoroughly the rosewater is added, and the whole beaten up in the mortar into a light, creamy paste.

The surface should be kept covered with this paste, spread on old linen or several thicknesses of gauze. A sheet of gutta-percha tissue may be placed over the dressing to prevent evaporation, unless this is uncomfortable, as it sometimes is, to the patient.

In deep-seated ulcers, which fortunately are seen but rarely, the treatment is usually surgical, the necrosed tissue having to be removed and the surface covered with skin-grafts.

PSORIASIS.

Synonyms.—*Lepra*, *Alphos*, *Psora*. Ger., *Schuppenflechte*.

Definition.—Psoriasis is a chronic, occasionally acute, inflammatory disease characterized by reddish-brown, flat papules, or circumscribed plaques or areas of varying size, covered with silvery-white, imbricated scales.

Symptoms.—In typical evolution, the papules and plaques of psoriasis always are sharply defined from the surrounding skin, somewhat infiltrated, slightly elevated, and covered more or less completely with silvery-white or mother-of-pearl-colored scales, which are arranged in thin layers like mica. On removal of the scales, there is exposed, in recent lesions, a bright-red surface; in older lesions the color is of a duller hue. If the deepest scale, which is often thin, translucent, and closely adherent, is pulled or scraped off, there can be seen several minute bleeding points, which correspond to the apices of papillæ beneath. The lesions vary greatly in number, size, shape, and distribution, but the type (that of the dry papule or plaque covered with scales) always remains the same; so that in uncomplicated cases psoriasis is a distinctly dry disease, without vesicles, pustules, or other moist lesions.

The primary lesion of psoriasis is a pinpoint- or pinhead-sized, flat, round or oval, sharply defined, slightly elevated, red papule, which always at the earliest moment of observation is covered either entirely or all but a narrow rim at the border with delicate silvery-white or

¹ Brit. Jour. Derm., 1903, xv, p. 390.

mica-white scales. The bleeding points produced by forcibly removing the scales may be so minute that they are only visible with the aid of a lens. As the lesion grows peripherally, it may become somewhat more infiltrated, slightly more elevated, and covered with more abundant imbricated scales; but otherwise it retains its original characteristics. Larger plaques and areas are all formed either by the gradual increase in size of the original papules, or by the coalescence of a number of papules or smaller plaques. The small plaques formed by the peripheral growth of single papules are usually round or oval, but areas formed by the coalescence of smaller plaques are irregular in outline. As a matter of convenience, descriptive terms have been applied to the lesions of psoriasis to denote their size and arrangement.

FIG. 62



Psoriasis, generalized and in large plaques.

Psoriasis punctata describes the disease which occurs in the form of small, scale-covered points. *Psoriasis guttata* indicates that form of the disease with lesions approximating the size of drops of water. When the patches become the size of small coins, they are termed *psoriasis nummularis* or *discoidea*. *Psoriasis circinata* or *orbicularis* is characterized by patches exhibiting activity at the periphery of the circle, the centre of which is free from disease; a condition due usually to the involution of the centre as the disease extends peripherally. The coalescence of spreading circinate patches produces *psoriasis gyrata* and *figurata*, in which case fantastic figures are frequently produced. *Psoriasis diffusa* indicates that form where the cutaneous surface is affected in large areas. When the coil-glands and hair-follicles are chiefly invaded, the disease is termed *psoriasis follicularis*. Areas of long persistence, in which the skin is infiltrated deeply and often fissured and covered with heavy scales, are designated as *psoriasis inderelata*.

Psoriasis rupioides (Cf. *Parakeratosis scutularis*) indicates a variety of psoriasis in which large, conical crusts, marked by concentric rings, occur on many patches.¹

In a given case the lesions may be of fairly uniform size, but more commonly, if at all numerous, they exhibit different stages of development, and therefore vary in size. They

FIG. 63



Psoriasis (large plaques).

may be arrested at any stage of growth, and persist for months or years as guttate, nummular, or larger plaques; or, by continued extension and coalescence, form areas covering an entire region of the body. Though cases are reported in which the surface of the entire body is covered, it is rare that areas of normal skin cannot be detected.

In number and distribution of its lesions and in its course psoriasis varies greatly. The disease commonly begins with one or two small papules, which increase slowly in size. In ordinary cases new lesions appear during the course of weeks, months, or years, until there are often from ten to one hundred or more patches of varying size scattered over the body. It is not unusual, however, for the disease to remain for years limited to two or three coin-sized areas, situated commonly over the elbows and knees. Occasionally, a single patch may persist indefinitely without the appearance of others. In other instances, but chiefly in recurrences of the disease, a large number of punctate papules may appear within a few days; and at times even a generalized, acute attack occurs. In the same individual the number, size, and distribution of the patches vary from time to time. With many patients the psoriatic areas partially or wholly disappear in summer, only to return in cold weather. In a smaller number of cases the disease is worse in summer and better or entirely absent in winter. Without the influence of climate or any other known cause, the disease may disappear, partially or wholly, for months or years and then return. In recurrences of the disease, the lesions do not neces-

sarily appear in summer, only to return in cold weather. In a smaller number of cases the disease is worse in summer and better or entirely absent in winter. Without the influence of climate or any other known cause, the disease may disappear, partially or wholly, for months or years and then return. In recurrences of the disease, the lesions do not neces-

¹ Anderson, *Treatise on Dis. of the Skin*, London, 1887, p. 310.

sarily correspond in number, size or distribution with those of earlier attacks. In acute febrile and other intercurrent diseases, patches of psoriasis may fade or disappear temporarily.

Involution of a patch of psoriasis begins in the centre, and is recognized by diminution in the hyperemia and in the scaling. The process progresses slowly until no trace of the disorder is left. Temporary pigmentation may remain for weeks (on the lower extremities for months) after the scaling and infiltration have completely disappeared.

FIG. 64



Generalized psoriasis. Lesions coalescing in places to form large plaques.

In distribution psoriasis is, as a rule, symmetrical, but exceptions to the rule occur. The sites of preference of the disease are the extensor surfaces of the extremities, especially about the elbow and knee, in which situation it is decidedly most common. After these locations should be named in order the scalp, the region of the sacrum, the upper surface of the chest, the face, the abdomen, and the genitals; more rarely the hands and feet.

Upon the scalp plaques of well-defined contour, covered with thick, whitish scales, may mat the hairs, but alopecia rarely results. Often a fillet or band one or two inches in width projects beyond the border line of the scalp over the forehead. When the vertex is bald from physiological loss of hair, the patch of psoriasis usually lingers near the fringe of hair left at the sides of the head, projecting thence to the regions of baldness. On the face the lesions are usually indistinct and

FIG. 65



Generalized psoriasis. Guttate and nummular lesions.

small in size, being displayed over the cheeks, chin, and nose, avoiding parts near the mucous orifices. In the genital region, also, the lesions are usually small and indistinct, and over the scrotum psoriasis is usually complicated by fissures, moisture, and other evidence of acute inflammation.

The hands, feet, fingers, and toes are not often involved, and the palms and soles only rarely. We have had two cases in which the dis-

case was limited to the palm for considerable periods of time before the appearance of characteristic lesions on other parts of the body. Other writers report similar instances. In many cases the nails are attacked, being thickened, eroded in points, irregularly laminated, rigid, brittle, and yellowish-white or dirty-whitish in color. In certain cases the nails alone are attacked (*Cf.* the chapter on Diseases of the Nails). On the palms and soles the lesions may show, instead of scaling, sharply circumscribed areas, in which the horny layer is much thickened. Occasionally, bullous lesions develop in these regions.¹ Through cracking and partial destruction of horny masses, the patches may assume a worm-eaten appearance.

Psoriasis is not known to affect the mucous surfaces. The lesions of so-called *psoriasis linguæ* are those of leukoplakia buccalis, or "smokers' patches," of syphilitic disease of the mouth, or flat epitheliomata (Hyde). This opinion is corroborated by other writers.² Schütz³ reports two cases and refers to others in which psoriasis was associated with mucous-membrane lesions. These lesions, however, occur with other cutaneous and systemic disorders, and their relation to psoriasis is not demonstrable.

In a patient subject to psoriasis, a local irritation, such as a pin-scratch or a mustard plaster, may cause new lesions to appear at the site of the irritation. Crocker⁴ describes a form of psoriasis punctata in which the lesions, though numerous, are limited to the sweat-ducts; and another form of punctate psoriasis in which the papules are situated about the hair-follicles.

The amount of scaling varies greatly in different persons and in the same individual. Ordinarily, the scales are abundant and thickly heaped up over even small areas; sometimes they are sparse over large areas. Free perspiration, friction by the clothing, or frequent bathing may prevent the accumulation of scales on areas where they would otherwise be abundant. Where the epidermis is thin, the scaling is less; therefore, over flexor surfaces, near the mucous orifices, and on the back of the hand the scaling is less than over the extensor surfaces and other regions. The scaling is more pronounced in advanced years. The scales may adhere with considerable firmness to the patch, or may be shed freely from the surface, in pronounced cases powdering the clothing of the patient or the sheets of the bed upon which he reposes at night. As a rule, the scales are disposed over the entire patch, extending slightly beyond the margin.

Instead of a lustrous white, the scales may display a deep yellowish shade; and instead of being imbricated they may form a continuous sheet of exfoliated epidermis. When the eruption is disappearing, the scales fall, leaving a pigmented or slightly discolored patch of integument.

¹ MM. Hallopeau et P. Salmon: Psoriasis palmaire avec Soulèvements d'Apparence bulleuse, *Bull. de la Soc. Fran.*, 1908, p. 243.

² Sée, *Annales*, 1903, iv, 219; and Oppenheim, *ibid.*, 1905, s. iv, vi, p. 379.

³ *Archiv*, 1899, xlv, p. 433.

⁴ *Diseases of the Skin*, 3d ed., p. 361.

Psoriasis is essentially a chronic disease, but may present at times acute exacerbation, and occasionally begin as an acute process. In the acute stages the inflammatory symptoms are more marked, and the lesions are of a brighter red color, and not so sharply defined as in the ordinary forms of the disease. The scales are fewer in number, thin and easily detached, and the sensations of burning and itching may be severe. When acute, the papules are usually numerous and punctate, and may appear on the face. In other instances, the patches may be as large as a small saucer; are dark- or lurid-red over the whole area; and are covered with a more uniformly constituted, thin, squamous film or sheet of semitransparent, delicate membrane, through which the red glare of the patch beneath is visible. This condition may be seen also in young persons to whom arsenic has been administered for the relief of the disease, with the production of irritative effects. An acute attack may come and go as such, but usually it terminates in a chronic form of the disease.

Subjective sensations may be entirely absent in psoriasis, even when it is extensive. There is, however, usually slight, but occasionally severe, itching. In acute cases burning and smarting are often present. In exceptional cases the subjective sensations interfere with sleep and rest; otherwise, the disease does not affect the general health of the patient.

Atypical and complicated forms of psoriasis¹ occur in which the character of the lesions is modified considerably. Rarely the scales may be heaped up in the centre in the form of an oyster shell, producing what is termed *psoriasis rupioides* or *psoriasis ostreacea*. In a few instances, the accumulated scales have assumed the appearance of a cutaneous horn.² Occasionally, sufficient thickening occurs to produce a wart-like appearance. These cases are termed *psoriasis verrucosa* (Besnier, Kaposi, and Crocker). The scales may be slightly greasy and the surface beneath exhibit a trace of moisture, making the diagnosis between psoriasis and dermatitis seborrhoica difficult if not impossible. Indeed, the two conditions may be associated. Occasionally, in moist situations, on the sensitive skin of children, or as an effect of local irritation or infection, the patches may be acutely inflamed and indistinguishable from ordinary eczema.

There can be no question that intermediate forms between eczema and psoriasis occur, in which forms it is difficult to determine whether the two disorders coexist, or the one has assumed the features of the other. In these cases there may be itching and infiltration of the skin, with vesicular and other lesions foreign to psoriasis, and a catarrhal discharge.³

Cavafy,⁴ Kuznitsky,⁵ and others report cases in which psoriatic lesions, though numerous, were limited to one side of the body.

¹ Beyer, Wien. klin. Wochenschrift, 1901, xiv, p. 805; a review of the subject, with classification of reported cases.

² Gassmann, Archiv, 1897, xli, p. 357.

³ Benassi: A description of the causes of moist forms of psoriasis. Giorn. ital., 1901, xxxvi, p. 427; abstr. in Monatshefte, 1901, xxxiii, p. 460.

⁴ Cited by Crocker.

⁵ Archiv, 1897, xxxviii, p. 405.

The sequelæ of psoriasis are, as a rule, nothing more than transitory pigmentation, but cases are reported in which involution of the lesions has been followed by superficial scars (Crocker, Hutchinson), keloid formations (Anderson, Purdon, Crocker), persistent, deep pigmentation (Crocker), or permanent achromia (Hallopeau et Gasne,¹ and Rille²). In some cases these unusual sequelæ were due, undoubtedly, to the treatment. A few instances have been reported by J. C. White,³ Hartzell,⁴ Schamberg,⁵ and others in which epithelioma has followed verrucous lesions which had developed upon psoriatic patches. Some, possibly all, of such changes were due, as suggested by Hartzell, to previous long-continued use of arsenic for psoriasis. The author recently studied a case of this type, in which several epitheliomata occurred on verrucous lesions in a patient suffering with psoriasis, who had taken arsenic for a long period of time.

When extensive, and especially after persisting for a number of years without amelioration, psoriasis may lose its distinguishing features and assume all the characteristics, both clinical and pathological, of dermatitis exfoliativa.

Etiology.—The cause of psoriasis is not known. Sex, social condition, and occupation evidently play little or no part in the etiology. The disease is common, comprising about 4 per cent. of all cutaneous affections reported in America. It occurs most frequently in the second and third decades of life, but no age is exempt. It is unusual for the first attack to appear after forty-five, and the disease is uncommon under ten, and rare under three, years of age. Rille⁶ reported a case in which the disease appeared in an infant six days old. Other cases in infants less than one year old have been reported by Neumann, Kaposi, and others.

Heredity is seemingly a factor in a considerable number of cases, in so far as inherited predisposition is concerned; but direct transmission of the disease itself by inheritance has not been demonstrated. Several careful observers believe that the disease is often hereditary. We have seen several families in which the disorder was present in three generations. A family history of psoriasis, however, is the exception rather than the rule. Engman's⁷ report of a psoriasis family-tree is interesting in this connection. Knowles⁸ found only six family cases in hundreds of cases examined, and concludes that psoriasis is not hereditary. It is of great rarity in the dark-skinned races. Such cases are reported by Dade,⁹ Winfield, and others.

An early conception of the cause of psoriasis was that it was a cutaneous manifestation of some humor. Gout and rheumatism played

¹ *Annales*, 1898, s. iii, ix, p. 690.

² *Ibid.*, 1901, s. iv, ii, p. 80.

³ *Amer. Jour. Med. Sci.*, 1885, lxxxix, p. 163.

⁴ *Ibid.*, 1899, cxviii, p. 265.

⁵ *Jour. Cut. Dis.*, 1907, xxv, p. 28; *ibid.*, 1909, xxvii, p. 130.

⁶ *Jour. Mal. Cut.*, 1890, xi, p. 385.

⁷ *Jour. Cut. Dis.*, 1913, xxxi, p. 559.

⁸ *Jour. Amer. Med. Assoc.*, 1912, lix, No. 6, p. 415; abstr. *Jour. Cut. Dis.*, 1913, xxxi, p. 57.

⁹ *Jour. Cut. Dis.*, 1909, xxvii, p. 207.

an important part in this hypothesis. But modern observers, in view of the rarity of the association of psoriasis with these disorders, give them a small place in the etiology.

The disease apparently bears no definite relation to any one systemic condition. It appears in individuals who are apparently in perfect health, as well as in the delicate and those ill of other disorders. Defective assimilation and elimination, such as exist in gout, rheumatism, and other arthritic disorders, as well as in plethoric and over-fed individuals, exercise an unfavorable influence on psoriasis. Associated with such conditions, psoriasis is usually indolent in type, but exceedingly persistent, unless the systemic condition is improved.

Metabolic disturbances have been attributed as a cause of psoriasis by a number of observers. Johnston and Schwartz,¹ in a careful study, found no recognizable disturbances in the nitrogen metabolism in cases of psoriasis. Brocq and Ayrignac,² in a careful study of the urine in psoriatic subjects, found no constant results. Schamberg,³ on the contrary, reported a remarkable instance of nitrogen retention in the studies of metabolism carried out in his experimental work. So striking was this example that further investigation is being made.

In the neurotic and poorly nourished, psoriasis is also persistent, but usually with more acute symptoms. The disease has been attributed to fright, shock, and other neurotic conditions. Acute toxemias of various origins have been followed by an outbreak in individuals predisposed to the disease. Pollitzer,⁴ in his study of the etiology of psoriasis (an excellent review of existing theories), concludes that rheumatism, gout, neuroses, and heredity are not direct etiological factors in the production of psoriasis, but in the present state of our knowledge it can neither be denied nor affirmed that they may have some bearing on the obscure conditions of the system which render it more or less susceptible to this especial infection.

Polotebnoff⁵ is a strong supporter of the nervous origin of psoriasis. He believes that psoriasis is one of the multiple symptoms of a vasomotor neurosis, in which the disturbances in the circulation, just as they occur in various organs of the body, sometimes extend to the skin. The neuropathic hypothesis has many supporters.⁶ Weyl⁷ believed that psoriasis was due to inherited weakness of the nerve-centres that regulate the nutrition of the skin, and that the cutaneous lesions were the superficial expressions of a central disturbance.

The parasitic theory of psoriasis is strongly suggested in many ways. Syphilis and tuberculosis have both been held responsible for the pro-

¹ Trans. VI. Internat. Derm. Congress, 1907, p. 862.

² Annales, 1906, s. iv, vii, pp. 433-460.

³ Research Studies in Psoriasis: A Preliminary Report, by J. F. Schamberg, John A. Kolmer, A. I. Ringer and G. W. Raiziss, Ph.D., Jour. Cut. Dis., 1913, xxxi, pp. 698, 802.

⁴ Jour. Cut. Dis., 1909, xxvii, p. 483.

⁵ Derm. Studien (edited by Unna), Hamburg, 1891, Series 2, vol. v, p. 347.

⁶ Weyl and others, including Besnier, Polotebnoff, Bourdillon, and Kusnitsky, Archiv, 1897, xxxviii, p. 405.

⁷ Ziemssen's Handbook, 1885, p. 247.

duction of psoriasis. Erasmus Wilson, followed later by R. W. Taylor, believed psoriasis to be due to an attenuated syphilis, and recently Ravogli¹ states his belief that psoriasis is of nervous origin, the underlying cause of the nervous changes being an extinguished syphilis. Menzer² believes psoriasis to be a cutaneous manifestation of a latent tuberculosis. Schoenfeld³ and Huebner⁴ made studies similar to that of Menzer, but could find no connection whatever between tuberculosis and psoriasis. Sellei⁵ describes sharply outlined, circular or ovoid bodies found deeply in the skin in cases of psoriasis. He regards these bodies as the probable exciting cause of psoriasis.

Pollitzer⁶ believes that psoriasis is most probably due to an external microbic infectious agent. Schamberg,⁷ in his study of the question of the parasitism of psoriasis, arrives at no definite conclusion as to the parasitic cause of the disease. In his research studies in psoriasis⁸ he states that an unidentified diplococcus *X* was found in five psoriatic lesions and in one blood-culture, and is deserving of further study; also, that an ultramicroscopic, mobile, bacillary body was discovered in seventeen out of nineteen cases of psoriasis. These bodies, also, are being further studied. Aside from these two, the other parasites cultivated from psoriatic lesions were discarded. Probably the earliest writer to discuss this phase of the subject was Lang,⁹ who described a fungus, which he named *epidermophyton*, that he believed to be the cause of psoriasis. His findings were confirmed by Wolff¹⁰ and Ecklund, but were later rejected by Neisser and others, including Ries,¹¹ who found the bodies described by Lang to be artificial products and not spores.

Many attempts to transmit the disease by direct inoculation have failed, but Bestot¹² apparently succeeded in inoculating himself from an infant who had vaccinal psoriasis.

The fact that psoriasis frequently has followed vaccination¹³ and other local injuries of the skin has been held by some as an argument in favor of the parasitic origin of the disease. Serkowski and Wisniewski¹⁴ have recently described ultramicroscopic organisms, resembling the Paschen corpuscles of variola, in psoriasis. Successful inoculations with these organisms are recorded. It has long been known that in

Jour. Cut. Dis., 1913, xxxi, p. 250.

¹ Deutsche med. Wochenschrift, 1912, xxviii, No. 45, p. 2119; abstr. Jour. Cut. Dis., 1913, xxxi, p. 127; and *ibid.*, 1913, xxxix, No. 33, p. 1599, abstr. *ibid.*, p. 1055.

² Deutsche med. Wochenschrift, 1913, xxxix, No. 30, p. 1446; abstr. Jour. Cut. Dis., 1913, xxxi, p. 1054.

³ *Ibid.*, 1913, xxxix, No. 11, p. 505; abstr. *ibid.*, p. 528.

⁴ Wien. klin. Wochenschrift, 1910, No. 29, p. 1075; abstr. Jour. Cut. Dis., 1911, xxix, p. 363.

⁵ Loc. cit.

⁷ Jour. Cut. Dis., 1909, xxvii, pp. 496-512.

⁶ Loc. cit.

⁸ Vierteljahr, 1879, p. 257.

¹⁰ Vierteljahr, 1884, p. 337; abstr. Annales, 1885, vol. vi, p. 305.

¹¹ Vierteljahr, 1888, xv, pp. 521, 685, 871 (a review of previous reports on the pathology of psoriasis, with bibliography).

¹² Annales, 1901, s. iv, ii, p. 337 (review of the case by Hallopeau, with discussion).

¹³ Weinstein, Brit. Med. Jour., 1902, i, p. 271 (*résumé* of 24 cases); also Rioblanco, Monatshefte, February, 1896, xxii, p. 195.

¹⁴ Nowinylek, 1913, Bd. xxv; abstr. Archiv, 1914, cxvii, p. 673.

psoriatic patients lesions may be developed artificially along the lines of mechanical irritation. In this way, figures in the shape of anchors, crosses, hearts, etc., have been produced on the skin of psoriatic patients, one of whom has been ingeniously photographed by Fox,¹ of New York.

The distribution of psoriatic lesions suggests that the disease may be influenced by the exclusion of sunlight from those portions of the body covered with the clothing and the hair. Certain it is that in exceptional cases only are the hands involved or is the face attacked at a distance from the line of the hairs upon the brow and bearded region. It is likewise true that after exposure of the affected areas to abundant sunlight, not only when patients are treated intentionally by such exposures of the nude body to light in hospitals and in private practice, but in occupations which necessitate the same, beneficial results often are marked.

In winter and in cold countries psoriasis is much more prevalent than in warmer seasons and climates. Kayser² reports that in the tropics the subjects of psoriasis are few, and the symptoms of the disease, when they develop at all, are rudimentary, the typical eruption being scarcely ever produced.

Pathology.—The pathogenesis and the proper interpretation of the histopathological changes in psoriasis are unsettled questions. A reference to the theories discussed in the etiology will suggest the hypotheses brought forward to explain the changes found.

The histopathology has been studied by Hebra, Kaposi, Bosellini, Jarisch, Schütz, and many others. All describe changes both in the epidermis and in the corium. Observers disagree as to which occur first, and also as to the interpretation of the findings. In the epidermis the epithelial cells are changed in character and in numbers. In the corium vascular changes and cell-infiltration are the most important. Robinson,³ who studied lesions in all stages of development, Thin, Jamieson, Tilbury Fox, and others believe the process begins with hyperplasia of the rete, which is followed by inflammatory changes in the corium. Other investigators of the earliest lesions, including Crocker and Verotti,⁴ believe that the pathological process begins as a circulatory disturbance in the corium, and that the epithelial changes are secondary.

In the corium the vessels of the papillary layer are chiefly involved, and show dilatation and perivascular cell-infiltration, consisting of two types of cells: polymorphonuclear leukocytes and small round cells. Some infiltration occurs also about the hair-follicles. The papillæ are greatly elongated, and in many instances the rete overlying the papillæ is thin, which fact accounts for the bleeding points which occur so readily in psoriasis. The rete shows a marked increase, the pegs

¹ *Photographic Illustrations of Cutaneous Diseases*, New York.

² *Geneeskundig Tijdschrift voor Nederlandsch-Indie*, 1907, xlvii, fasc. 5.

³ *New York Med. Jour.*, 1878.

⁴ *Annales*, 1903, s. iv, iv, p. 633 (bibliography of recent literature).

being elongated (acanthosis). The cells are softer, and there is probably intracellular edema. The transitional layers are not formed in the ordinary case, and cells containing nuclei are found in the stratum corneum.

The scales occur as lamellæ, and, being loosely held together, are lifted, allowing air to get into the spaces. Leukocytes which have migrated from below form small, dry abscesses between the outer layers of the stratum corneum. This was first described by Munro¹ and later by Kopytowski,² Bonnet³ and others. Munro and others believe that the leukocytic accumulations above described are the first changes that occur in psoriasis, and also that this demonstrates the parasitic origin of the disease. Sabouraud⁴ found similar abscesses in pityriasis rosea, and states that many superficial inflammations show leukocytes and coagulated serum between the lamellæ.

Diagnosis.—The recognition of a pronounced case of psoriasis is made with ease. As usual, it is the atypical form of the eruption that awakens doubt. The diagnostic features of the common type are summarized in the first paragraph, under the heading of symptoms.

Eczema.—Eczema elects the anterior surfaces of the body, the neighborhood of the mucous outlets, the flexor surfaces of the joints and limbs, the crevices, folds, pockets, depressions, and protected angles of the skin. Psoriasis elects the posterior surfaces of the body, avoids the vicinity of mucous outlets, and occurs over the extensor aspects of the joints and extremities, especially about the knee and elbow. Both disorders occur in the scalp. Eczema commonly spreads downward over the face, involving the nose, lips, chin, and region back of the ear. Psoriasis ordinarily involves only the upper part of the forehead.

In individual patches eczema will be recognized by its severe itching; by the scratching it excites; by the history of moisture, discharge, and crusting; by its ill-defined outline; by its asymmetrical disposition, except upon the similarly irritated hands and feet; and by the fewer, more yellowish, smaller, and less lustrous scales which characterize its squamous varieties. In squamous eczema, moreover, the areas are, as a rule, larger, more irregular in shape, fewer in number, and the less perfectly defined outline does not show the small, round plaques which unite to form the larger psoriatic areas.

Dermatitis Seborrhoica.—In seborrhoic dermatitis, the scales are smaller, greasy, and less abundant; the surface beneath is moist or oily, shows no bleeding points, and is less reddened than in psoriasis. The lesions are most numerous on the scalp, over the sternum, and between the scapulæ, and are rarely found on the elbows and knees. From the scalp the disease spreads by choice down behind the ears and over the forehead. A fringe may be formed similar to that which occurs in psoriasis. The individual lesions and differences in scaling are indicated above.

¹ *Annales*, 1898, s. iii, ix, p. 961.

² *Ibid.*, 1899, s. iii, x, p. 765.

³ *Lyon Méd.*, 1907, fév. 24, p. 350; abstr. *Annales*, 1907, s. iv, viii, p. 704.

⁴ *Jour. Cut. Dis.*, 1903, xxi, p. 61.

Syphilis.—Psoriasis in many cases greatly resembles the squamous and papulo-squamous syphilides. In syphilis the greatest aid will be obtained by a history of infection, adenopathy, and mucous patches; and in women abortions, miscarriages, and stillbirths. Psoriasis is a singularly uniform disease; syphilis is decidedly multiform in its manifestations. Syphilitic patches are less symmetrical, more elevated at the edge, and the scales with which they are covered are fewer, smaller, dirty-yellowish rather than lustrous in color, and are apt to form a collarette about the base of the lesion instead of occurring in an imbricated manner over the margin. Their circular outline is often abruptly broken by gaps, thus producing semilunar and small arc-shaped segments. In syphilis the eruption is less generalized, and shares with other syphilodermata the brownish and purplish hues of the skin beneath; and the base of the syphilitic lesion is indurated. The scales of many of the syphilides which resemble psoriasis partake of the character of crusts, being agglutinated by exudations from the patch. They are only occasionally squamous as in psoriasis. The squamous syphiloderm of the palms and soles often occurs only in these localities. Psoriasis is extremely rare in such situations, and is seldom limited to these regions exclusively. A psoriasiform circle limited to the region of the mouth, nose or chin will generally prove to be syphilitic. The disease which has for a long time persisted in the production of squamous patches can generally be demonstrated to be psoriasis, as syphilis changes its type in the course of months.

Pityriasis Rosea.—In this disease the patches occur most commonly on the trunk, rarely on the arms, and practically never in the scalp. The patches are more oval than circular, the scales are finer, and on their removal no bleeding points are seen. The centre of the patch is usually tawny or salmon-colored. The disease is much more superficial, less inflammatory, and more rapid in its career than psoriasis. Complete involution is accomplished usually in a few weeks, and recurrences are rare.

Lichen Planus.—The primary lesions in lichen planus are minute, flat, angular papules, which as individuals rarely become as large as the cross-section of a small pea. The larger areas are formed always by grouping and coalescence of small papules, whereas similar areas in psoriasis are produced by peripheral extension of the early papule. Instead of presenting distinct scales, the lichen planus papule is covered with a thin, horny layer, giving the papule a glazed or varnished appearance. There is a tendency to linear arrangement of the lesions, and when these coalesce to form larger areas the latter are commonly linear or angular in outline. The larger papules and patches in lichen planus have a characteristic purplish or violaceous hue, which never is seen perfectly in psoriasis. The favorite sites of lichen planus are the flexor surfaces of the wrists and forearm and the legs above the ankle. It is rarely conspicuous on the elbows and knees and other sites of predilection of psoriasis.

Pityriasis Rubra Pilaris (*Lichen Ruber Acuminatus*) is a comparatively rare disorder, and has for primary lesions fine, pointed, scale-capped papules, which do not enlarge peripherally, but form larger areas slowly by the coalescence of many small papules, some of which can be demonstrated at the borders of large areas. The characteristic circular areas and typical scales of psoriasis are wanting, and there is frequently some impairment of the general health. In exceptional instances, however, the two disorders may terminate in a general exfoliative dermatitis, in which case it is impossible to state which of the two disorders originated the final condition.

Trichophytosis Corporis.—In ringworm of the body there are, as a rule, fewer patches, and these are more distinctly circular. They rarely attain the diameter of two inches without showing a clearing centre and a slightly elevated border covered with furfuraceous scales. In more than half the cases vesicles are present. Subjective sensations are usually marked; and, finally, by microscopic examination, the *Megalosporon ectothrix* or *endothrix* will be discovered, which establishes the diagnosis.

Favus of the Scalp might rarely be mistaken for psoriasis of the same region, but the occurrence of sulphur-colored, cup-shaped crusts, the lustreless and brittle condition of the hairs, and the presence of irregular areas of alopecia or of reddened scar-tissue, with a possible history of contagion, and, finally, the demonstration of the *Achorion Schönleini*, will insure identification of favus.

Treatment.—Though it is unusual to see cases in which psoriatic lesions cannot be removed temporarily, the disease often returns, and is exceedingly resistant to treatment. A method which is successful in a given case may fail in the next; and even when it gives prompt relief in a given case at one time it may fail utterly in subsequent attacks of apparently the same nature. The involution of the disease under treatment is, as a rule, not rapid, and a chosen method should not be abandoned until it has been given a thorough trial.

General Treatment.—The general condition of each patient must be ascertained and given due consideration in the treatment. There are many cases of psoriasis in which the treatment will prove unsuccessful until an accompanying systemic disturbance is recognized and given proper attention. On the other hand, when the health, habits, and surroundings of the patient are normal, it is better to give local treatment a thorough trial before resorting to arsenic and other drugs which are supposed to have a specific action.

When, as in the anemic, the debilitated, the neurotic, the gouty, or the rheumatic, a systemic disorder is demonstrated, the indications for treatment are clear. The doubtful cases are those in which, after careful study, no definite systemic disturbance is discoverable. Psoriasis occurs not infrequently, and is often especially persistent, in individuals who may be classed as fleshy, plethoric, or overfed, without other evidences of ill-health. In such cases a restricted diet and increased elimination, with possibly the administration of an alkaline

diuretic, are effective aids to local treatment. Some writers advocate such measures in all cases, unless they are contraindicated by anemia or other conditions calling for increased nutrition of the body.

As a rule, the diet should be simple and nutritious. In most instances, meat, sweets, pastries, hot breads, hot cakes, and highly seasoned foods should be largely or wholly avoided. Vegetables and fruit may be eaten freely. In acute conditions, when the subjective sensations are annoying, the diet should be practically that recommended for acute stages of eczema. Alcohol, coffee, tea, and tobacco should be interdicted or used in moderation only. In properly selected cases, an animal-free diet is often of great service. Passavant, however, claims to have cured himself and others by a diet exclusively of meat.

The influence of climate in inveterate psoriasis should never be ignored. Many patients who suffer from repeated relapses of the disease are worse in winter, and are either better or entirely free from the eruption in summer. In mild climates, in which the temperature is uniformly registered at or near a point of maximum comfort for the skin, this disease is both infrequent and less severe. Given an equable climate, many patients obtain prompt relief at the seashore, while others improve rapidly under the influence of a dryer atmosphere and higher altitude. The majority of patients with psoriasis are, however, either unable or unwilling to seek a change of climate for the relief of a disease which, at worst, is only an annoyance. In cold and changeable climates some patients add greatly to their comfort by varying their dress to meet the exigencies of the weather, thus keeping the skin at as even a temperature as possible. When there is much itching, cotton or linen underwear next to the skin is required.

Internal Treatment.—Among the remedies supposed to have a specific action upon psoriasis, arsenic enjoys the highest rank. In some cases prolonged administration of arsenic gives temporary or even permanent relief. In a large proportion of patients, however, carefully selected as fit subjects for this therapeutic agent, it will prove utterly valueless even in the most skilled hands. Moreover, it is not possible to determine in advance what cases will yield to arsenic; and even with a given individual the drug may be of great value at one time and at another without effect. Recognizing these facts and bearing in mind its possible ill effects, the wisest course is not to employ arsenic at first, but to delay its administration in any case until local treatment has been given a thorough trial.

Arsenic is valuable chiefly in persistent cases of psoriasis, in which the lesions have ceased to enlarge. It is unsuited for all cases of the disease occurring with rather acute symptoms, such as those having subjective sensations and exhibiting unusually vivid redness of the patches. It should not be given when the disease is in process of evolution; and therefore not in psoriasis punctata and psoriasis guttata, unless the lesions have long been limited to patches of the sizes to which these names are given. For the same reasons, it is often objec-

tionable in the psoriasis of the young, for, though the drug is usually well tolerated in early periods of life, it is at this time that the disease is most often encountered in its progressive stages.

The following rules for the administration of arsenic are in general to be observed: It should be given at first in small doses, which are to be increased cautiously. In case toxic effects appear, the dosage should be reduced, but not completely discontinued unless such course be imperative.

Individuals not infrequently possess a marked idiosyncrasy for arsenic, and cases are seen also in which its administration for psoriasis is followed by acute exacerbation of the disease, with decided aggravation of the subjective symptoms. A considerable period of time is required for arsenic to affect the lesions of psoriasis, and therefore its value cannot be tested in any case in less than from several weeks to three months' time. The prolonged use of large doses of arsenic has been followed in many instances by palmar and plantar hyperkeratosis, and in a few instances by verrucous growths, some of which have become epitheliomatous.¹ Continued use of arsenic is capable, also, of producing more or less generalized pigmentation, with or without a diffuse hyperkeratosis.

The preparation of arsenic usually employed internally is Fowler's solution, the administration of which should be begun in doses of from $\frac{1}{4}$ to 3 minims (0.033–0.2), this amount to be contained in a solution of fixed and relatively large dose, such as a teaspoonful of infusion of peppermint, wine of iron, dilute syrup of gentian, of orange-blossoms, or compound tincture of cardamom with water. When only remedial effects are obtained, such as diminution of the scaliness, the dose may be steadily continued without change for long periods of time, and usually with advantage for some time after the symptoms of the disease have disappeared. When, without the production of toxic effects, the eruption seems unaffected by treatment, the arsenic may cautiously, and always under the direction of the physician only, be pushed until 10 or more drops of Fowler's solution are administered at a dose. Other preparations of arsenic may be used. A solution of sodium arsenite is preferred by Stelwagon in cases of weak digestion. Arsenic trioxid may be given in doses varying from $\frac{1}{40}$ to $\frac{1}{20}$ (0.0016–0.0033) grain in pill or tablet, or in the form of the Asiatic pill, the formula for which is given in the section on General Therapeutics. This pill is less likely to be well tolerated than Fowler's solution, but cases are on record in which a psoriasis which proved rebellious under other forms of arsenic yielded to the Asiatic pill.

Sodium cacodylate, an organic compound of arsenic containing 55 per cent. of arsenic trioxid, has been recommended and used largely by some French dermatologists. It is supposed to disturb digestion less and to be comparatively free from the danger of producing toxic symptoms. The dose *per orum* recommended is from $\frac{1}{2}$ to 3 grains

¹ White, Hartzell, Schamberg, and others. Loc. cit.

(0.033–0.2) three times a day. That it is not safe in large doses was demonstrated by Murrell,¹ who gave a patient 1 grain (0.06) three times a day until, on the eleventh day, there suddenly appeared serious symptoms of intoxication. Dermatitis following its use is reported by Balzer and Griffin.² We have seen a diffuse dermatitis exfoliativa induced by the administration of sodium cacodylate for the relief of psoriasis. For the past few years the usual method of administering this preparation has been by hypodermatic injection, giving from $\frac{3}{4}$ to 3 grains (0.0495–0.2). Hartzell³ has injected atoxyl intramuscularly in the case of eight patients who were psoriatic with apparent benefit. Enésol has been used by injection in the treatment of psoriasis by Sabouraud⁴ and Duc.⁵ The former obtained good results in nine out of twelve cases treated, and recommends the treatment for further trial.

Salvarsan has been used to a moderate degree in the treatment of psoriasis without success. Pollitzer⁶ saw no effect on psoriasis in a syphilitic patient to whom he administered salvarsan. Winfield⁷ reports the cure of a case with salvarsan in a patient having a positive Wassermann. Trimble, discussing Winfield's case, reported two cases of psoriasis, treated by himself and Dr. Fox, which were relieved by the use of salvarsan, both patients having syphilis in addition. In several cases treated by Trimble no benefit accrued. Several patients of our own, having both syphilis and psoriasis, who were treated with salvarsan, showed immediate relief of the luetic symptoms, but little or no effect on the psoriatic lesions was noted. Schwabe⁸ and others report similar results.

Satisfactory results often follow the internal administration of mercurous iodid in $\frac{1}{5}$ grain (0.013) doses after meals. The remedy is given for its alterative effect and not with a view to a suspected syphilitic etiology. Phenol and nitric acid, the last-named in the largest medicinal doses, are highly extolled by some authors.

In acute cases, Crocker advises the use of sodium salicylate and salicin. We have found the salicin of value in such cases, in doses ranging from 10 to 20 grains (0.66–1.33), three times a day. Haslund recommends potassium iodid, increased from the smaller to the largest tolerated doses. As many as 600 grains (40.) *per diem* of the iodid have been administered by this method. It is of occasional service. The wine of antimony in 5 to 10 minim doses (0.33–0.66); chrysarobin, $\frac{1}{8}$ grain (0.01) rubbed up with sugar of milk, three times daily; and potassium bromid and sodium iodid have also been administered with reported success.

In plethoric or rheumatic patients local treatment is often rendered more effective by the internal administration of alkalies, such as liquor

¹ Lancet, 1900, ii, p. 1923.

² Jour. Amer. Med. Assoc., 1908, li, p. 1482.

³ La Clinique, June 7, 1912, No. 23, p. 361.

⁴ Ibid., July 5, 1912, No. 27, p. 429.

⁵ Jour. Cut. Dis., 1913, xxxi, p. 175.

⁶ Münch. med. Wochenschr., lvii, No. 36.

⁷ Annales, 1897, s. iii, viii, p. 732.

⁸ Ibid., p. 493.

potassæ, potassium citrate or acetate, or sodium bicarbonate, in doses of from 10 to 30 grains (0.66–2.), taken with large quantities of water three times a day. In the gouty state, with excess of urates in the urine, Robinson advises:

R—Potass. acetat.,	℥j;	30	M.
Spts. æther. nit.,	f℥ss;	15	
Vin. colchici,	f℥ij;	8	
Syr. aurantii,	f℥jss;	45	
Sig.—A dessertspoonful three times daily in water after meals.			

Winfield¹ reports much success in the treatment of psoriasis with colonic irrigation and the internal administration of lactic acid.

As to the other remedies employed internally for the relief of the malady, a very fair estimate of their value can be made by remembering that arsenic is superior to them all. Phosphorus, tar, copaiba, oil of turpentine, cantharides, colchicum, and pilocarpin have at times a feeble, transitory influence over the patches of the eruption, but their employment will disappoint far more than satisfy. The treatment of psoriasis by the administration of thyroid extract practically has been abandoned as fruitless of desirable results.

Local Treatment.—The local treatment of psoriasis requires patience, care, and a certain degree of skill. In a large majority of cases a remedy can be found which, when applied with proper care and persistence, will remove the lesions completely. This result, however, does not insure the patient against recurrence of the disease. The first indication to be met is the complete removal of the epidermic scales from the patches. This may be accomplished in various ways. It is preferable to secure first their maceration in some fatty substance, such as one of the oils, or glycerin or vaselin, after which the scales may be washed off with the aid of soap and water, the patient being given a general bath if the eruption is extensive. After such bathing a salicylated salve (10 to 20 grains (.66–1.33) of the acid to the ounce (30.) of cold-cream salve or Lassar paste) may be applied to the patches from which the scales have been removed. If the eruption be localized, the salve or paste may be spread upon pieces of lint or cotton, and thus be retained in contact with the skin by a bandage. The scales may also be removed rapidly with a dermal curette, if they occur in localized patches. The squamous masses are also removable with water alone, as after maceration of the skin in a bath, or after a profuse diaphoresis, or even after moderate exudation of sweat, if evaporation of the latter be prevented by covering the affected part with oiled silk or with rubber tissue. Usually, there is no difficulty in removing the scales, patients often declaring they can do this without assistance.

Exposure of the skin to solar light is of value in many cases. Domenci² describes the case of a young man, twenty years of age, who

¹ Jour. Amer. Med. Assoc., August 10, 1912, p. 416.

² Gazz. d. Osped., 1908; abstr. in Derm. Centralb., 1908, xii, p. 15.

had suffered with psoriasis for eighteen months. The patient was improved after twenty minutes' exposure to the sun's rays. In one month the scales ceased to form and at the end of the season he was completely relieved. There was no recurrence for one year. We have found some patients who could free themselves from the disorder by giving the affected parts a sun-bath daily or several times a week.

Baths play an important part in the subsequent treatment of the disease. They may be employed, as by Hebra, so that the patient remains in the water from four to eight hours each day; or be medicated by the addition of sulphur, tar, or other substances, so as to combine a medicative with a macerative effect. Montgomery¹ has recently emphasized the value of baths in psoriasis. In private practice these baths are much less available than in hospitals. When the eruption is generalized and an excessive macerative effect is desired, an undershirt and drawers made of soft rubber cloth may be worn by the patient for a few hours each day. By the sweating thus induced it will at times be found possible to secure complete disappearance of the psoriatic patches.

In other more obstinate cases, or in those in which for any reason vigorous treatment is indicated, as upon the scalp and face, *sapo mollis* may be employed with advantage in the soap-and-water treatment. The *linimentum saponis mollis* may be rubbed briskly over the patches with the aid of a piece of flannel or a sponge, and then immediately washed off with the oil and scales in a surplus of hot water or left for a time in contact with the part. Hebra and Kaposi employed a species of soap-paste, made by rubbing into each patch a small quantity of green soap, to which a little water is added until the proper consistency is reached. These inunctions are repeated twice daily for six days. The epidermis becomes brownish colored, and in three or four days afterward it exfoliates in lamellæ; then a general bath cleanses the surface. In the French hospitals a somewhat speedier method is pursued. On the evening of the first day the patient is anointed with green soap, which is retained upon the skin during the night. In the morning he takes an alkaline bath, and immediately after is thoroughly anointed with lard. This course is repeated on the second and third days, after which the patient is ready for topical medication of the affected areas.

For the more obstinate cases, in which exfoliation of the epidermis is not readily induced, more energetic measures have been adopted, such as the local use of salicylic acid in alcohol, 1 drachm (4.) to 4 ounces (120.); caustic acid and alkalies; scrubbing the patches with stiff brushes, and with clean white sand.

Once ready for topical medication, the patches may be subjected to the local action of the remedy selected for the disease. The choice of a vehicle for the application of remedies is a matter of importance. For hospital patients, moderately soft ointments, such as lanolin or lard, with or without the addition of cold-cream ointment, may be rubbed

¹ Jour. Amer. Med. Assoc., October 26, 1912.

into the patches, which may then be covered with cloths spread with more of the same ointment. For such cases, an ointment which keeps the surface soft and favors penetration of the remedies is usually more rapidly effective than the drier pastes, especially when there are much scaling and infiltration. When the patches are irritated moderately, and in acutely spreading areas, the protection afforded by the paste is often of more value than the closer contact of the remedy with the lesion permitted by the soft ointment. But the majority of patients with psoriasis are unable to give the time necessary for hospital treatment, and remedies must be chosen which will not interfere with the usual vocation of the individual. For the scalp and other hairy parts, vaselin, or equal parts of vaselin, lanolin, and olive oil, are convenient ointment bases. For the face and hands a moderately soft ointment may be used as directed above for hospital cases. When the occupation of the patient will permit, the lesions may be kept covered with a thin coating of the same ointment during the day; or this may be removed entirely and the patches protected with a tragacanth-varnish (see section on General Therapeutics), which in turn must be washed off at night before applying the ointment. For covered portions of the body, the most convenient base is a paste; equal parts of vaselin, lanolin, zinc oxid, and talcum making a good combination. When the lesions are few in number, the paste may be spread on a cloth and applied. In more extensive areas, the paste may be spread in a thin layer over the patches, which then are covered freely with any simple powder. This is patted on with the hand or with cotton until a dry surface is formed which does not adhere to the clothing. The under-clothing next the skin should be of soft cotton.

For circumscribed areas, flexible collodion, liquor guttæ perchæ (traumaticin) holding in solution the remedies to be employed, or medicated plasters are more convenient and cleanly than pastes or ointments.

Salicylic acid, in paste, ointment, or plaster, and in strengths varying from 2 to 20 per cent., is often effective, and is free from the disagreeable and even dangerous properties of some of the stronger drugs. For the face, scalp, and hands, there is no better remedy in the majority of cases than ammoniated mercury in 2 to 20 per cent. ointment or paste. This remedy is cleanly and usually causes the lesions to disappear; but it cannot be used over large areas without danger of absorption and constitutional symptoms.

Chrysarobin, first recommended in the treatment of psoriasis by Squire, of London, in 1878, is the most efficient of local applications. The drug may be applied in strengths varying from 2 to 40 grains (0.13-2.66) to the ounce (30.) of ointment, paste, plaster, collodion, or liquid gutta-percha. It is used occasionally in greater strength, but with pure specimens it is likely in larger proportions to produce disagreeable effects, commonly manifested in a dermatitis of varying degree. Even in the strength mentioned above, it is necessary to begin its use with caution, testing it by application first to a limited area of integument. The dermatitis usually subsides in a few days. A

plan followed by us is to have the chrysarobin, whether in liquid, paste, ointment, or other vehicle, applied daily until a slight erythema is detected at the edge of the brownish discoloration produced by the application. Its use is then suspended until the reaction has subsided. As a rule, the application may be repeated on five successive days. In some instances, one single application produces a reaction, while in others ten or more fail to do so.

Chrysarobin should be reserved for the persistent and subacute or chronic forms of the disease. When the lesions are numerous or in large areas, the most rapid results are obtained by applying the remedy in the form of a soft ointment, 20 to 60 grains to the ounce (1.33-4. to 30.), which may be rubbed thoroughly into the patches daily. The surplus ointment may be wiped off and the skin covered with a dusting-powder. Used in this way, the drug stains the underclothing and the skin and in time produces a dermatitis. For circumscribed areas, chrysarobin may be applied in collodion or liquor guttæ perchæ (traumaticin), in the strength of from 5 to 10 per cent. After the scales have been removed thoroughly, a film of this preparation is applied with a brush or swab and allowed to dry. The application may be renewed daily, as above suggested. An effective combination, suggested by Fox, is 10 parts each of chrysarobin and salicylic acid, 15 of sulphuric ether, and 100 of flexible collodion. Besnier suggests making a solution of chrysarobin in chloroform, 20 to 40 grains (1.33-2.66) to the ounce (30.), which is applied to the patches. The chloroform rapidly evaporates, leaving the powder adhering to the surface. This is then covered with a layer of traumaticin or collodion. Instead of dissolving the chrysarobin in chloroform, it may be mixed with water to form a paste and applied in the same manner. Fox uses chrysarobin in a 50 per cent. aqueous solution of ichthyol. After painting this on the patches and allowing it to dry, a dusting-powder may be used.¹

Hallopeau reports cases in which the lesions disappeared when kept covered with unmedicated traumaticin.

When chrysarobin produces its most brilliant effects, the psoriasis patch, previously denuded of its scales, assumes a whitish and normal aspect, contrasting strongly with the chocolate or brownish-black discoloration of the stained skin at the periphery. The patient for whom chrysarobin is ordered should be informed of the stain produced on his skin and clothing and the possibility of a dermatitis. For these reasons it should not be employed on the hands, face, or in the scalp, except under unusual circumstances. Novorobin, a derivative of chrysarobin, recently brought forward by Schamberg (presented at the thirty-eighth annual meeting of the American Dermatological Association, 1914), has the advantage of being more active and less disagreeable to use, owing to the fact that the staining qualities are reduced.

The tars probably rank next to chrysarobin in value in the treatment of psoriasis. On account of their ability to produce undue reac-

¹ By combining the autoserum treatment with the local application of chrysarobin unusually good results have been obtained.

tions in susceptible skins, it is well to employ them first on a relatively small portion of the affected surface; and it is necessary to leave the medicament on for several hours, as the tars do not in all cases produce prompt reactions. Often black puncta are visible when the tar is lodged in the orifices of the cutaneous follicles, simulating thus the "blackhead" of the comedo, a condition termed by Hebra "tar-acne."

Pix liquida, oleum cadinum, or oleum rusci may be employed in the form of a salve, 1 drachm (4.) of either to the ounce (30.) of lard or other fatty base (lanolin, vaselin). A thin layer of this ointment may be painted over or well rubbed into a patch denuded of scales twice daily. In Vienna a still more energetic effect is secured by using a soft soap freely over the patches while the patient is in the bath, then anointing him with tar, and finally returning him to the bath, in which he remains from four to six hours.

For localized eruptions, green soap in combination with tar and alcohol serves a useful purpose, either in the proportion of equal parts of the three ingredients or by combining them in other proportions, as, for example:

R—Saponis mollis,	℥iv;	120	
Ol. rusci.,			
Glycerin.,	āā ℥j;	30	
Ol. rosmarin.,	℥jss;	6	
Alcoholis.,	Oss;	240	M.
Sig.—For external use.			

Other combinations of service are the *liquor picis alkalinus*, the formula for which is given in the chapter on Eczema; or Wilkinson's salve, as modified by Hebra, the latter combining the remedial effects of sulphur, tar, and soap, as follows:

R—Sulphur. sublimat.,			
Ol. rusci (crud. vel. rectific.),	āā ℥ss;	15	
Saponis mollis,			
Adipis,	āā ℥j;	30	
Cret. præparat.,	℥jss;	3	33 M.
Sig.—Wilkinson's salve, modified.			

Where the sensitiveness of the skin to the action of tar has not been tested, or when the skin is particularly tender,¹ a small quantity of the Wilkinson salve may be added to any simple ointment; or Spender's ointment of tar (see the section on General Therapeutics) may be substituted. Afterward 1 drachm (4.) of the oil of tar, or of oleum rusci, to the ounce (30.) of oil of almonds or of alcohol may be employed.

When toleration is established, the tar may be rubbed over the patches in a pure state with a stiff brush, a procedure preferred in some parts of Germany, after which the patient either remains for some hours in bed, or is powdered with soapstone and bandaged with flannel, so that when the clothing is replaced it may not adhere to the tar.

¹ Burnett, J.: Treatment of Psoriasis in Children, Merck's Arch., 1908, x, p. 171.

Absorption of any tarry compound applied externally may result in general toxic symptoms, including fever, vomiting, diarrhea, strangury, or the elimination of the toxic agent in secretions which are blackened by its presence. These symptoms are usually relieved in from twenty-four to forty-eight hours after the discontinuance of the drug.

Pyrogallol, first suggested as a remedy for psoriasis by Jarisch, is inferior to chrysarobin. It is used in the strength of 10 per cent. in vaselin. It is effective, though less rapid in effect than chrysarobin, is cheaper, is odorless and painless, and it discolors to a less extent the sound skin. Both remedies are capable of being absorbed from the skin-surface and of producing constitutional symptoms (pyrexia, strangury, and blackish evacuations). Even fatal results have followed the use of pyrogallic acid.

Beta-naphthol ($C_{10}H_8O$) was first employed in psoriasis by Kaposi.¹ It may be applied in alcoholic solution. Following the employment of a 15 per cent. ointment, Kaposi reported speedy disappearance of psoriatic patches. It does not stain the skin, hair, or nails.

Crocker, of London, similarly advised thymol in ointment, 10 to 30 grains (0.66–2.) to the ounce (30.); and Williamson advises turpentine, 2 drachms (8.) to the ounce (30.) of olive oil, with the odor corrected by the oil of lemon.

Circumscribed areas have been treated successfully by the daily application of compresses wet in a 1 to 300 or a 1 to 200 solution of potassium permanganate,² or in 70 to 90 per cent. alcohol containing 2 per cent. of salicylic acid.³

For inveterate cases, Unna and Dreuw recommend the following:

R—Acid. salicylic.,	℥ijss;	10	M.
Chrysarobin,			
Ol. rusci,	āā 3v;	20	
Saponis mollis,			
Vaselin.,	āā 3vj;	24	
Sig.—For external use.			

Blaschko⁴ finds Rochard's formula of value in stubborn cases which do not yield to chrysarobin:

R—Iodi pur.,	gr. x;	66	M.
Hydrarg. chlorid. mitis,	gr. xxvj;	17	
Vaselin, vel adipis,	q.s. ad. ℥iij–℥ijss;	100	

These stronger applications must all be used with caution, and any dermatitis produced should be treated with soothing ointments.

The nitrate, as well as the iodid and oxid, of mercury in the form of ointment is applied by many practitioners to patches of psoriasis usually few in number and limited in extent. The action of these agents, however, is inferior to that of those already named. Other articles more recently suggested in the external treatment of psoriasis

¹ Wien. med. Wochenschrift, xxxi, pp. 617, 641, 681.

² Hallopeau, Annales, 1902, s. iv, iii, p. 518.

³ Lau, Semaine méd., September 13, 1899.

⁴ Archiv, 1901, lvi, p. 253.

are thilandin, which seems to possess some value; hydracetic; cacodylic acid; rufigallic acid, 10 per cent. in an ointment base; cupric oleate; anthrarobin; and gallacetophenol, 5 to 10 per cent. in salve or in traumaticin.

Heimann¹ recommends the use of the Uviol lamp in the treatment of psoriasis.

Radiotherapy is a clean, efficient and most valuable method of local treatment in psoriasis. In the majority of instances, psoriatic lesions disappear with more certainty and with much greater rapidity under x-rays than with any other local measure. The rays should be employed with great caution, and a dermatitis should not be induced. Few exposures of moderate intensity suffice. A dermatitis may be produced in an area the seat of psoriatic lesions by an amount of x-rays which, if applied to the normal skin, would produce little or no reaction. Telangiectasia is prone to develop in areas in which an active dermatitis has been induced. Recurrence of lesions takes place after radiotherapy as after other methods of treatment. Great caution is necessary in treating a series of recurrences, especially if the recurrent lesions occupy areas formerly involved. Radiotherapy is not recommended in psoriasis of the scalp, on account of the resultant alopecia, and should be the method of choice only in selected cases.

Prognosis.—The permanent relief of a grave case of psoriasis is not insured by any treatment, though hundreds of patients are permanently relieved by even the simplest measures. The disease often recurs, and may do so repeatedly for the greater part of a lifetime. Permanent relief, therefore, should be neither promised nor predicted in any case. Once relieved, it should be the aim to guard against all possible recurrences. It is important to insist that treatment shall be followed until the last lesion has been cleared away. If even a few small areas are left, recurrence will follow more surely and quickly. After relief of any obstinate or recurrent attack, as also in inveterate cases, the prognosis is greatly improved by the removal to a climate suitable for the psoriatic patient.

Parakeratosis Scutularis.—Under this title Unna² described an affection characterized by abnormal cornification, affecting the body in areas, and accompanied by superficial inflammation. The lesions are described as occurring on the leg in patches the size of a shilling to a half-crown or larger, as being livid-red in color, and showing special involvement of the hair-follicles. In the follicles are described horny balls, which are early yellowish-red in color, later chalky-white, and which finally run together and form with the interfollicular scales peculiar large, bent shields, one or more of which are placed in the middle of the brownish areas. The under surface of the shield is dotted with a large number of thorn-like horny balls, representing the horny balls drawn from the follicles. On the scalp the hairs are enclosed

¹ Jour. Cut. Dis., 1911, xxix, p. 635.

² Internat. Atlas, 1890, Part 3, No. 8; Histopathology, p. 286.

in bundles of yellowish-white, waxy, horny frills, which run together and form a yellowish-white cap, closely adherent to the head. Weiss,¹ under the title *Parakeratosis ostracea (scutularis)*, described a case with lesions closely simulating those above described. In this there were scattered over the body-surface discrete, variously shaped, larger and smaller, whitish and yellowish, laminated and raised masses. The resemblance between the rupioid psoriasis of McCall Anderson and this case was striking (see Psoriasis). It is believed by many that the two cases above mentioned are rare and unusual forms of psoriasis.

PARAPSORIASIS.

Synonym.—Resistant Maculo-papular Scaly Erythrodermia.

Fox and MacLeod,² in a careful study of a case of parakeratosis variegata and a survey of the literature at that time, classed under the second title above the following disorders: erythrodermie pityriasique en plaques disséminées (Brocq); dermatitis psoriasiformis nodularis (Jadassohn); pityriasis lichenoides chronica (Juliusberg); lichenoid psoriasiform exanthem (Neisser); and parakeratosis variegata (Unna, Pollitzer, Santi). At a somewhat later date, Brocq³ introduced the term parapsoriasis for this group of diseases, and proposed the three following divisions: *parapsoriasis en gouttes*, *parapsoriasis lichénoïde*, and *parapsoriasis en plaques*. This classification includes the various manifestations, and presents a clear conception of the group.

Definition.—Parapsoriasis is a rare disease of the skin characterized by persistent, red, scaling patches or lichen-planus-like lesions, devoid of subjective sensations, and resistant to therapeutic measures. The disease, as described in individual cases, varies as to type. A particular study of the disorder has been made by J. C. White,⁴ C. J. White,⁵ Corlett and Schultz,⁶ Anthony,⁷ Sir Malcolm Morris and Dore,⁸ Sutton,⁹ and others in addition to the authors above noted.

Symptoms.—In all varieties the persistence of the lesions in spite of treatment is characteristic. The lesions occur chiefly on the trunk and limbs. The inflammatory process is superficial and devoid of infiltration and of subjective sensations. The primary lesion is a macule or maculo-papule, often scale-covered, which spreads peripherally. New lesions slowly but surely appear, until larger areas become involved. In this way the guttate, retiform, and patchy varieties are produced. A true conception of the disease cannot be had from observation of a single case. The individual cases differ from each other in a striking manner. The particular features of each must therefore be depicted. At present it cannot be stated which variety occurs most commonly.

¹ Jour. Amer. Med. Assoc., 1912, lix, p. 343.

² Brit. Jour. Derm., 1901, xiii, pp. 319-346, inc.

³ Annales, 1902, s. iv, iii, p. 433.

⁴ Ibid., 1903, xxi, p. 153.

⁵ Ibid., 1906, xxiv, p. 455.

⁶ Ibid., 1913, xxv, p. 115.

⁷ Jour. Cut. Dis., 1900, xviii, p. 536.

⁸ Ibid., 1909, xxvii, p. 49 (literature).

⁹ Brit. Jour. Derm., 1910, xxii, p. 249.

Guttate Variety (*Parapsoriasis en gouttes* (Brocq), *Dermatitis psoriasiformis nodularis* (Jadassohn), *Pityriasis lichenoides chronica* (Juliusberg).—In this variety a close resemblance to psoriasis is noted. Again, at times, a scaling syphiloderm is simulated. The eruption is very superficial, consisting of pinhead- to pea-sized papules, round or oval in form, and of an intense, clear-red color. The larger are paler, well-defined, and flat, with an occasional central depression. The smaller are slightly pointed. Scaling may be quite perceptible, or the papules may be devoid of scales. The lesions are somewhat firm, and some

FIG. 66



Parapsoriasis. (Fordyce.)

are follicular. The scratched lesion is red and bleeds but little. The scale, when removed, is found to be thicker in the centre than at the periphery. New papules or nodules appear here and there as the eruption gradually increases. In the beginning there is an areola of redness. No subjective sensations are present, and involution of the lesions is uncommon. The hands, face, and scalp are usually free from attack.

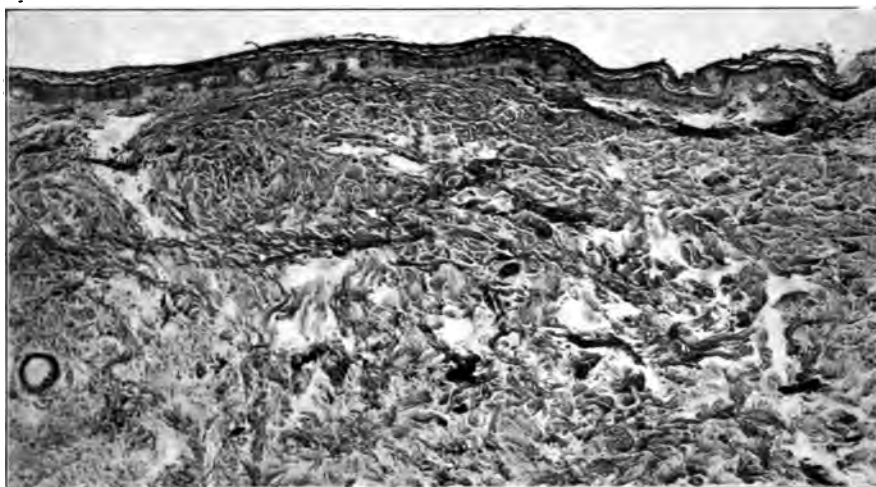
In a patient presenting this type, studied for some years by the author, the primary lesion was a red papule, scale-covered at all points. As the lesion enlarged, in this particular instance, it assumed

a darker hue. The sites of election were the trunk and limbs. The patches were from pea- to dime-sized, and remained unchanged for long periods of time. At varying intervals, new lesions would develop, being light-red at first, later assuming the above mentioned characteristics. The lesions were but little influenced by treatment.

Pick,¹ Civatte,² and Milian and Pinard³ have reported cases of this disorder which, on microscopical examination, were found to be tuberculides. Civatte surmises that they are all of this nature.

Retiform Variety (*Parapsoriasis lichénoïde* (Brocq), *Parakeratosis variegata* (Unna, Pollitzer, Santi), *Lichen variegatus* (Crocker).—In

FIG. 67



Erythrodermic pityriasis. (C. J. White.) Section. Low power. Represents the section as a whole, with the most gravely affected regions of the corium and of the epidermis in the centre of the photograph. The great atrophy of the epidermis and the disorganized condition of the corium are well shown. On each side of the photograph the corium is beginning to appear more normal, and on the left hand the various normal deeper structures are present. Hematoxylin-eosin.

this variety the eruption is more generalized than in either of the other forms, and is represented by lesions that may be described as intermediate between those of lichen planus and psoriasis. The subjects of this disorder have been adults in the third and fourth decades of life. The eruption is usually generally distributed over the trunk and extremities and is retiform in character, almost as though the patient were covered with a net. This peculiar appearance is induced by hyperemia occurring in the form of a patchy network, enclosing areas of a less intense hue. The primary lesion is a reddish-yellow or darker colored,

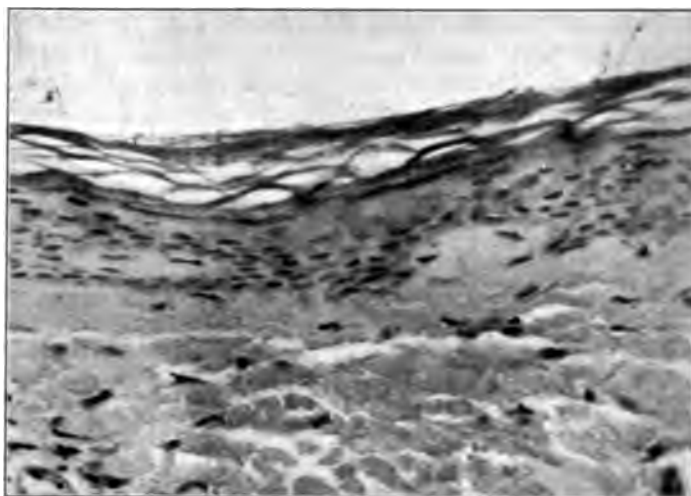
¹ Archiv, lxi, p. 411.

² Annales, 1906, p. 209 (Brocq's clinic).

³ Annales, 1907, s. iv, viii, p. 477.

flat-topped, scale-covered papule. The lesions on coalescing produce the peculiar picture above described. The extremities may be the seat of a more marked dermatitis, with increased scaling, and also with more distinct papulation, the papules being flat-topped, shining, lichen-planus-like. In a few recorded cases, the premycotic stage of mycosis fungoides has been mistaken for this eruption.¹ One such case came under the observation of the author. This patient for some years was considered by experts to be suffering with parapsoriasis of the retiform type, but subsequently developed true mycosis fungoides, to which he later succumbed. This form of parapsoriasis is resistant to treatment.

FIG. 68



Erythrodermie pityriasique. (C. J. White.) Section. High power. Represents the most severely affected area of the epidermis. The rather increased stratum corneum and the marked changes of the other layers are clearly seen. Hematoxylin-eosin

Parapsoriasis en Plaques (Brocq).—The cases described under the title of *Erythrodermie pityriasique en plaques disséminées* and *Xantho-erythrodermie perstans* by J. C. White, Crocker and others belong to this group. In this variety plaques or patches of varying size and irregular shape occur on the trunk and limbs. The patches are well defined, range in size from that of a dime to a walnut or larger, and present varying shades of red, reddish- or yellowish-brown or fawn-color, and at times a darker brown. In certain cases a seborrheic dermatitis is simulated. Moderate scaling is usually present, and the scales are small and adherent. In certain instances visible scaling is absent. On pressure the color may all be removed. There is no ele-

¹ Jamieson, Jour. Cut. Dis., 1901, p. 440; Hudelet and Gastou, Annales, 1901, s. iv, v, p. 1090; and also the first case of Unna.

vation of the lesion, no infiltration of the skin, and subjective sensations are absent. The lesions are very persistent and show practically no tendency to undergo spontaneous involution, but are clearly resistant to treatment. The patches sometimes are so delicate as to appear like a mere stain.

Etiology.—The cause of parapsoriasis is unknown. It is essentially a disease of adult life, though one patient studied for some years by the author, developed the disease at the age of twelve years, and at the present time is suffering with active manifestations of the disorder, with but little change after sixteen years' duration. Exposure to excessive heat has been given as a factor in some cases. Men are more frequently attacked than women. There appears to be no connection between psoriasis or lichen planus and this disorder.

Diagnosis.—Parapsoriasis is to be differentiated from dermatitis seborrhoica, psoriasis, lichen planus, the maculo-papular syphiloderm, and the premycotic stage of mycosis fungoides. By taking into consideration the chief characteristics of this disorder as described heretofore—the persistence of its lesions in spite of treatment, their superficial character (being devoid of infiltration and subjective sensations), their gradual evolution, their slow spread, and their location—it may be recognized.

Pathology.—The pathogenesis of the disorder is unknown. C. J. White¹ suggests that the disease may be due to involvement of the deeper arterial twigs, producing a local ischemia, in consequence of which the other changes described occur. The histology, as summarized by Fox and MacLeod, is as follows: In the corium is found a superficial inflammatory process, confined to the papillary and subpapillary layers, with dilatation of capillaries, edema, and cellular infiltration. The epidermis shows interepithelial edema and defective cornification. In the prickle-cells is found a moderate parenchymatous edema. Nuclei are present in the stratum corneum. No necrosis is noted, and the prickle-cells appear healthy. Corlett and Schultz,² in their careful histological study, call special attention to the vascular involvement, which they consider the essential change and the cause of the other abnormal histological findings.

Treatment.—A few cases have undergone spontaneous involution, the remainder have been resistant to treatment. All sorts of local and internal treatment have been tried, but no method has been proved successful. In the plaque variety we have obtained temporary results with radiotherapy. Internally, arsenic has been given a good trial, and the salicylates and salicin have been used. Locally, the stimulating treatment recommended for psoriasis may be used in the guttate and small-patch varieties. In the widely distributed cases, stimulating preparations are not recommended. Milder measures, such as are recommended for a slight degree of dermatitis, should be employed.

¹ Loc. cit.

² Loc. cit.

Prognosis.—As indicated above, the prognosis is unfavorable as to relief of the lesions, but good so far as the general health of the patient is concerned. In a few instances the plaque variety has been relieved, but as a rule the eruption is unaffected by any method of treatment.

PITYRIASIS ROSEA.

Synonyms.—Pityriasis Maculata et Circinata, Herpes Tonsurans Maculosus, Pityriasis Circinata. Fr., Pityriasis rosé de Gibert, Pityriasis circiné et marginé, Pityriasis disséminé, Pityriasis rubra aigu, Roseole squameuse (Chapard).

Definition.—Pityriasis rosea is an acute, rarely chronic, self-limited, eruptive disease, characterized by superficial scaling patches of varying size, usually round, oval, or circinate in outline, having a pale-red hue, with often a fawn-colored centre, and situated chiefly on the trunk. This disorder was first recognized and described by Gibert,¹ and later by Bazin,² Horand, Duhring,³ and others.⁴

The subjects are commonly young adults, but the disease is seen in children and those in middle life, of both sexes. The outbreak of the malady, in exceptional cases, may be preceded for a variable time by languor, lassitude, inappetence, or a feeling of chilliness. Occasionally, the first noticeable symptom is the occurrence of mild fever, the body temperature rarely rising above 102° F. There may be slight swelling of the submaxillary or cervical glands. General adenopathy has been reported. In acute cases there may be distinct congestion of the fauces. In large numbers of cases, however, no constitutional symptoms are present.

In some cases, Brocq⁵ believes in all, the general outbreak is preceded for a week or ten days by a single lesion, situated usually at the side of the trunk. This "primary lesion" may often be recognized as the largest, most conspicuous, and most brilliant in hue of all the patches which later develop. The eruption often escapes recognition for a time after its appearance, on account of its sparseness or the trifling degree of itching it arouses. When fully developed, it is characterized by the conspicuous appearance over large surfaces of the trunk, especially upon the integument covering the clavicles, the ribs, and the scapulæ, less often on the exposed face and hands, of numerous pinhead-to small-coin-sized or larger, circumscribed, roundish or oval-shaped, slightly elevated, macular or maculo-papular lesions, which are fitly designated by Thibierge as "médaillons." These lesions may be discrete, closely set, or confluent, and instead of being elevated may be either on a level with the general surface or slightly depressed, with

¹ *Traité pratique des Maladies de la Peau*, Paris, 1860, i, p. 402.

² *Affections génériques de la Peau*, Paris, 1862, p. 365.

³ *Amer. Jour. Med. Sci.*, 1880, lxxx, p. 359.

⁴ Moingeard, *Thèse de Paris*, 1889; Chapard, T., *ibid.*, 1885; C. Colcott Fox, *Lancet*, London, 1884, ii, p. 485; Thibierge, *La Pratique dermatologique*, 1902, iii, p. 894 (with colored plate).

⁵ *Annales*, 1887, s. ii, viii, p. 615.

an annular border. They are dry, covered with furfuraceous, rather adherent scales, and vary in color from a yellow or tawny (chamois-skin shade) to a deep red. The infiltration is slight, and the patch is situated superficially. Itching is commonly inconspicuous among the symptoms, but in acute and extensive cases may be severe.

The fully-formed disks vary in long diameter from the width of a finger-nail to three or four centimeters or more. G. H. Fox¹ emphasizes the fact that extensive marginate patches may be formed by confluence of smaller areas. The oval contour is that more often recognized as characteristic of a well-developed lesion, the long axis of the disk usually corresponding with the lines of cleavage, and the terminal extremities of the oval being slightly frayed by the irregularity with which the fine, branny scales are there disposed. The patch frequently has a tawny salmon shade, which is characteristic of the disease, and enlarges by peripheral extension, leaving a relatively clear centre. The scales often have a silvery-grayish color. The eruption may be fairly well generalized, but the face and other exposed parts of the body commonly escape, though the scalp may be involved. In the latter event, the hairs are unaffected. The evolution of the eruption may be by successive development of the eruptive elements at intervals for one to ten weeks or longer.

The variations exhibited by the exanthem in this affection are distinct, but are scarcely ever sufficient to mask the characteristic appearance of the oval or circular plaques over the neck, the arms, the abdomen, or the extremities; sometimes first appearing over the latter and extending thence to the trunk.

Fox² calls attention to the close similarity between pityriasis rosea and eczema marginatum of the axilla and groin. Scholtz³ reports three cases illustrating this point. At times a retiform expression is given to the picture by coalescence of the patches. The disease occasionally occurs in the negro.⁴ Wile⁵ reports pseudo-vesicles associated with other lesions in a case of pityriasis rosea.

There may be moderate itching, with nocturnal exacerbation, but the usual type of the disease is mild. The affection runs its course ordinarily in from four to eight weeks, but may last for several months, if new lesions continue to appear. Fox⁶ believes that there is an acute (the common) and a chronic (the rare) type, and quotes a case of Hallopeau's which lasted for four years. Recurrences are rare, though we have noted several such instances. Towle⁷ and others have reported recurrent cases.

Etiology.—The causes of this disease are obscure. It is without question more common in the spring and in autumn than in the other seasons. Bazin believed it occurred chiefly in lymphatic and scrofulous

¹ Jour. Amer. Med. Assoc., August 17, 1912, lix, p. 493.

² Loc. cit.

³ Lancet Clinic, 1912, cviii, No. 21; abstr. Jour. Cut. Dis., 1913, xxxi, p. 375

⁴ Howard Fox, Jour. Cut. Dis., 1908, xxvi, p. 67; Schamberg, *ibid.*, 1909, xxvii, p. 267

⁵ New York Med. Jour., November 13, 1909.

⁶ Loc. cit.

⁷ Jour. Cut. Dis., 1909, xxvii, p. 364.

patients. Most of the patients are young (fifteen to forty years of age); many are of the female sex, have light hair and delicate skins, and have been enfeebled by physical fatigue or overtaxation in school. Profuse perspiration has been assigned as a cause by Horand.

Though no true epidemics are reported and positive evidences of contagion are wanting, it occasionally happens that the disease is so unusually prevalent during a few weeks in a given locality as to suggest an epidemic. There are also instances in which two members of the same family were affected.¹ It is possible that the disorder is feebly infectious and allied to the exanthemata. Szóaboky,² in 50 per cent. of 119 cases of this disease, recognized that there was but slight febrile movement before the development of the eruption. Of the entire number of patients only one had a return of symptoms. After microscopic examination, he failed to recognize a parasitic etiology for the disease; but in 66 per cent. of cases discovered that there were functional troubles of different character connected with the nervous system (sweating, trembling, pallor and redness, headache, and exaggerated reflexes). A large number of observers believe the disorder to be parasitic, among the earliest of these being Vidal. Oppenheim³ recognized double-contoured organisms in the lesions, suggesting an *oidium*, which in one instance appeared to transmit the disease from cultures. Mewborn⁴ found a fungus with septate mycelium, staining with a central granular portion and clear, unstained margins. Dubois⁵ describes a cryptogamic parasite, represented by masses of round spores up to 5 microns in size, found within the follicular and glandular orifices, which he believed to be etiological in pityriasis rosea.

Pathology.—The histopathology of the disease has been studied by Darier, Unna, Hollmann,⁶ and Sabouraud.⁷ The changes begin apparently in the papillary body and the subpapillary layer of the cutis, and include a dilatation of the vessels, perivascular cell-infiltration, and edema. As the disorder progresses, these changes are more marked, especially in the perivascular cell-infiltrate. The rete shows decided intracellular edema and proliferation of the prickle-cells, especially in the interpapillary portions. As the disease approaches its acme, minute vesicles (not visible on macroscopic examination) form beneath the horny layer, which later is exfoliated. Sabouraud states that these vesicles are found in the outer layers of the epidermis, much as the "dry abscesses" described by Munro are formed in psoriasis. The absence of polymorphonuclears (phagocytes) in the vesicles leads him to believe that the disease is not parasitic, but a vesicular erythema of toxic origin.

¹ Crocker; Zeisler, *Jour. Cut. Dis.*, 1893, p. 494; Fordyce, *ibid.*, p. 497; G. H. Fox, and others.

² *Monatshefte*, 1906, xlii, p. 495.

³ *Verhandlung. der 79 deutsch Naturforscher und Aertze*, September, 1907.

⁴ *Jour. Cut. Dis.*, 1906, xxiv, p. 431.

⁵ *Annales*, January, 1912, s. v, iii, p. 32; *abstr. Jour. Cut. Dis.*, 1912, xxx, p. 382.

⁶ *Archiv*, 1900, li, p. 229.

⁷ *Revue pratique des Maladies cutanées, syph. et ven.*, June, 1902; *abstr.*, *Jour. Cut. Dis.*, 1903, xxi, p. 55.

Diagnosis.—The diagnosis is simple, especially if a number of oval patches show the usual arrangement, with long axes in the lines of cleavage. When the lesions are numerous but less perfectly developed, and are of the smaller, maculo-papular and less inflammatory type, the disease may resemble a maculo-papular syphiloderm so closely as to deceive even the expert. In the absence of all other evidences of syphilis, the delay of a few days will usually permit the development of either the typical oval lesions of pityriasis rosea or of other signs of syphilis. In syphilis the elementary macules are uniformly smaller and much less disposed to scale. Ordinarily, the lesions of pityriasis rosea are less infiltrated, are of a brighter but paler tint, and are usually more rapid in evolution than those of syphilis. The congestion of the fauces in the former is of a bright-red color and diffuse, while that of syphilis is dull-red and circumscribed. Other diseases to be differentiated are the following:

Dermatitis Seborrhoica.—In this disease, the slow development of the lesions; their distribution over the scalp, sternum, and between the scapulæ, rather than on the trunk along the lines of cleavage; the coarser and more abundant scales; the fine papules on the one hand or large areas on the other; and the absence of the oval lesions of pityriasis rosea, will establish the diagnosis. There are cases in which the differential diagnosis is exceedingly difficult or almost impossible, and which suggest an intermediate stage between the two disorders.¹

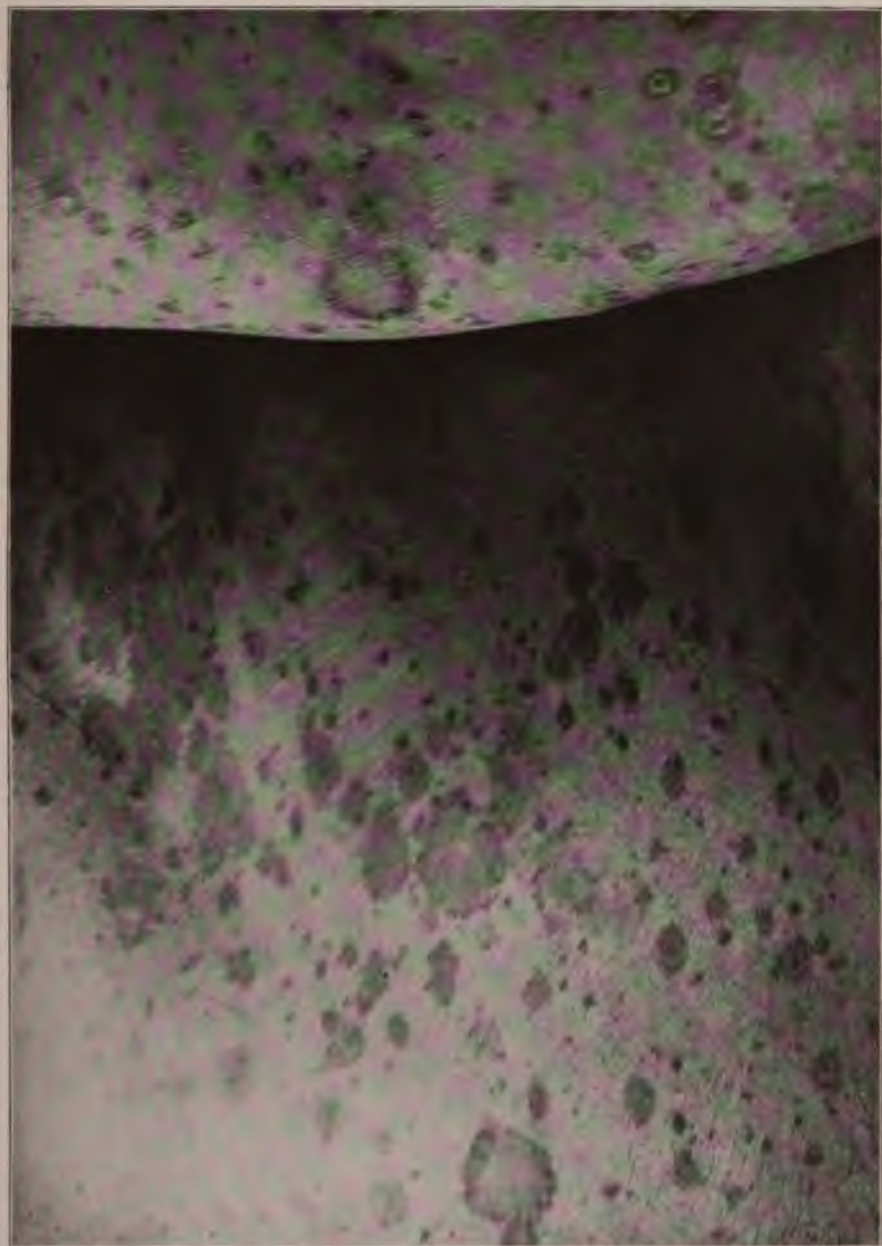
Psoriasis.—In psoriasis the patches are infiltrated, elevated, and more sharply defined. The abundant imbricated and silvery-white scales, the bleeding points beneath, and the distribution of the lesions, are points of value in the diagnosis.

Ringworm.—In ringworm of the glabrous skin the lesions are rarely so numerous or so symmetrically distributed. The areas are more definitely circular, more circumscribed, and often display minute vesicles at the periphery. The areas show clearing centres and are usually larger than those of pityriasis rosea. Finally, the trichophyton fungus can be demonstrated in the scales.

Treatment.—Pityriasis rosea, as a rule, is a self-limited disease, in which the duration and career vary greatly in different cases. Consequently, it is difficult to judge of the value of treatment in a given case. Systemic treatment should be varied to meet the indications in each instance. General symptoms, if present, should receive appropriate attention. In the major portion of cases no internal treatment is required. Crocker believed the course of the disease is shortened by giving salicin in 15 grain (1.) doses three times a day. Locally, mild sulphur or other antiseptic ointments appear to shorten the duration of the disease in many instances. A convenient and simple treatment, which we have employed with apparently good results in many cases, is as follows: The patient takes a bath at night before retiring, and after drying the skin applies to the areas a weak vinegar or dilute solution

¹ Besnier, *Annales*, 1889, s. ii, x, p. 108.

PLATE V



Pityriasis Rosea.

of acetic acid, and before this dries follows with a 10 to 15 per cent. solution of sodium hyposulphite. In a few moments, after the surface is dry, a simple dusting-powder may be applied. In the few instances in which itching or burning is annoying, the underclothing should be of silk or cotton, and the surface of the body should be kept constantly covered with some adherent powder, like zinc stearate. Occasionally, it is necessary to use soothing, mildly antipruritic lotions or ointments, such as are recommended for the early stages of eczema. In unusually extensive cases, in which itching is a pronounced feature, mild exposures to x-rays are followed by prompt cessation of subjective sensations and by more rapid involution of the lesions.

DERMATITIS EXFOLIATIVA.

Synonyms.—General Exfoliative Dermatitis, Pityriasis Rubra (Crocker), Erythrodermie Exfoliante (Besnier), Dermatite Exfoliatrice.

Definition.—Dermatitis exfoliativa, as the term indicates, denotes a general redness of the skin accompanied by scaling. Much confusion has existed concerning this disease, and many terms have been used by various writers to designate particular groups studied. In this work the following types will be considered:

1. *Dermatitis exfoliativa* (Wilson).¹ This group includes the so-called primary type. With these will be included the so-called secondary cases, originally described by Buchanan Baxter.² When fully developed, these secondary cases are indistinguishable from those of the primary type. This type follows such diseases as psoriasis, eczema, dermatitis seborrhoica, lichen planus, pityriasis rubra pilaris (Devergie), and dermatitis venenata, and develops either spontaneously or as the result of irritant applications to the primary disease. In this group of secondary cases, also, should be placed those produced by the local application of hydrargyrum, chrysarobin, and arnica, and possibly also those induced by the internal administration of quinin, arsenic, antipyrin, and antitoxin.

2. *Pityriasis rubra* (Hebra),³ a special type characterized by small scales, absence of infiltration, final atrophy, and commonly fatal termination.

3. *Dermatitis exfoliativa neonatorum* (Ritter),⁴ a special type of the disease occurring in infants.

4. *Dermatitis exfoliativa epidemica* (Savill),⁵ a type described as occurring in epidemics, largely among the poor in homes and asylums. The recurrent scarlatiniform erythema⁶ is not included in this group,

¹ Med. Times and Gazette, London, 1870, i, p. 118.

² Brit. Med. Jour., 1879, ii, p. 79.

³ Diseases of the Skin. The New Sydenham Society Translation, vol. ii, p. 69.

⁴ Central Zeits. f. Kinderheilk., 1878, Ed. 2.

⁵ On an Epidemic Skin Disease. Brit. Jour. Derm., 1892, iv, pp. 35-62 and 69-100.

⁶ Féréol: Pseudo-exanthème scarlatiniforme récidivant. Bull. et Mem., Soc. méd. des Hôp. de Paris, 1876, ii, 30; and Besnier.

although it presents many features in common. In certain cases, instead of having recurrences, this disease becomes persistent, when it might be considered a member of this group (*Cf.* chapter on Scarletiform Erythema).

Dermatitis exfoliativa (*Wilson, Brocq*). Exfoliative dermatitis is a disorder in which, over considerable portions or the entire surface of the body, the skin is reddened and covered with lamellated scales, which are exfoliated freely from the surface. The degree of hyperemia varies

FIG. 69



Dermatitis exfoliativa.

in different cases. The redness displayed in the regions affected may be a bright crimson, an erysipelatous, or a purplish shade, with sometimes a faint tinge of yellow. The scales vary in size and in the rate of formation in different cases, and are usually thin and papery. They are commonly attached at one border and overlap, but in certain cases the attachment occurs in the centre. They are usually larger and more numerous over the extremities and back than over the neck, face, and chest. In the scalp they are usually matted together with sebum and form a crust. The palms of the hands and soles of the feet

PLATE VI



Dermatitis Exfoliativa. (Fordyce.)

1

2

are usually affected late in the disease, and sometimes escape altogether. Here the epidermis peels off in large plates. In the course of the disorder the hairs may fall, and in some cases the alopecia is general. The nails become opaque and dystrophic, and there is usually thickening of the nail-bed, which pushes the nail upward, with resulting deformity. In certain cases the nails are shed.

The disease commonly begins with redness, upon which desquamation supervenes. The articular folds of the skin in the genital region and the head and trunk are most often the early seat of the disease, which may involve consecutively one part after another. The affection may be limited to one region, or several distinct regions may be involved simultaneously. As a rule, the disorder, beginning in patches,

FIG. 70



Primary exfoliative dermatitis.

spreads rapidly, and in the course of from one to two weeks covers the entire surface. At times, constitutional symptoms accompany the beginning of the disorder, exhibited as malaise, chills, fever, and inappetence, and later recurring elevation of temperature is associated. In severe cases the features of the patient may be disfigured slightly by tumefaction of the lips, swelling of the ears, and puffiness of the eyelids. In most cases the skin is dry, but rarely is moistened with pathological discharge. Often there is coincident adenopathy. The mucous surfaces of the eyes, nose, mouth, and throat may participate in the general disorder and become the seat of inflammatory, and in rare cases even of pseudo-membranous and exfoliative, processes. The subjective sensations are variable. Itching and burning may be

present in all degrees or absent entirely. Chilliness is always a prominent symptom.

In the secondary cases, the disease when fully developed is indistinguishable from that described above.

The course of the disease is variable; recurrences are frequent, and cases are recorded which have lasted for a half-century.¹ In certain cases there is rapid loss of strength and weight, although in many the general health is unaffected. The urine is commonly normal, although in certain cases albumin may occur. Its presence is considered of grave portent by Morris, Pringle,² and others. Tidy,³ in a study of the metabolism in exfoliative dermatitis, concludes that the excretion of nitrogen and fluid in the urine is deficient, the excess being excreted by the skin, and that the excretion of uric acid is excessive; but that these changes in the urine are secondary to the changes in the skin.

Pringle⁴ records cases in which the patients became insane, and gives insomnia as an important symptom.

Etiology.—Males somewhat outnumber females as subjects of the disease, the majority being between twenty and forty years of age.

The several toxemias, gout, rheumatism, tuberculosis, chronic alcoholism, the general causes of anemia, asthenia, and cachexia, have all been cited as etiological factors in the several forms of exfoliative dermatitis, and in cases each of the causes named has been effective. The disease is in many instances profoundly affected by climatic influences, often first appearing in the autumn of the year. Local applications of hydrargyrum,⁵ chrysarobin, and arnica⁶ have been followed by dermatitis exfoliativa, and it is possible that certain cases following the administration of quinin, arsenic, antipyrin, and antitoxin serum may be of the same type.

Pathology.—The histopathology of these affections has been studied by Brocq,⁷ Vidal,⁸ Girode,⁹ Unna,¹⁰ Bowen,¹¹ and others. The findings have been exceedingly variable, due probably to the fact that the examinations have been made at different stages of the disorder, and possibly also of different types. As a rule, the following findings have been noted: a cellular infiltration of the corium, particularly the upper part, in certain cases, this being found also more deeply around the hair-follicles and sweat-glands; and other evidences of cutaneous involvement, such as dilatation of the blood-vessels, and edema, with its consequent changes. In the epidermis the changes usually noted

¹ Mackenzie, S: On Dermatitis Exfoliativa Universalis. Brit. Jour. Derm., 1889, i, pp. 285-303, inc. A series of 21 cases.

² General Exfoliative Dermatitis (Pityriasis Rubra). Debate, London Dermatological Society, Brit. Jour. Derm., 1898, x, pp. 437-464, inc.

³ Brit. Jour. Derm., 1911, xxiii, pp. 133-149, inc.

⁴ Loc. cit.

⁵ White: Jour. Cut. Dis., 1912, xxx, pp. 707 and 708. Case I.

⁶ Crocker: Diseases of the Skin, p. 400. Bowen: Jour. Cut. Dis., 1910, xxviii, p. 1 (a fatal case).

⁷ Annales, 1882, p. 534.

⁸ Annales, 1888, p. 519.

¹¹ Loc. cit.

⁹ Bull. Soc. méd. des Hôp., March, 1882.

¹⁰ Histopathology, p. 274.

have been parakeratosis and acanthosis. In cases of long standing pigment deposits are found in the corium.

Bowen¹ describes the histology in a typical case of the Wilson type as follows: desquamation of the horny layer in strips, with nuclei in the cells (parakeratosis); collections of leukocytes lying below the horny layer; stratum granulosum absent; rete thickened, especially the interpapillary portions (acanthosis); leukocytes between the epithelial cells; a sharply differentiated cell, stained with eosin, found here and there among the epithelial cells; in the corium vascular dilatation, with perivascular cell-infiltration in the upper portion of the papillary layer (oval and spindle connective-tissue cells, small round cells with large nuclei, and a few eosinophiles), and elongation of the papillæ. The sebaceous and coil-glands, collagen, and elastin were normal.

The pathogenesis of the disorder is not indicated by the histological findings.

Diagnosis.—The disease is to be differentiated from other scaly dermatoses. Psoriasis, lichen planus, and dermatitis seborrhoica, which sometimes develop into dermatitis exfoliativa, can be differentiated, as a rule, by recalling the distinctive features in each of these disorders. It is only in rare instances that they become generalized. The selection of particular regions of the body by these disorders, the character of the scaling, and their accompanying subjective symptoms, are all of diagnostic value. The possibility of a dermatitis exfoliativa being the prefungoid stage of *granuloma fungoides* should be remembered.

In more advanced stages of the disorder, the history of recurrences, and its special features would be of value in diagnosis.

From pemphigus foliaceus, dermatitis exfoliativa is distinguished by the absence of bullæ, and by the absence in most cases of grave systemic disturbance, although there may be stages of pemphigus foliaceus which present all the characteristics of a dermatitis exfoliativa.

From pityriasis rubra (Hebra) it is distinguished by the history in the latter of steady progression without remissions; the universally reddened, scaling epidermis, without infiltration; the ultimate atrophy of the skin; the not infrequent ulceration and gangrene; and, finally, the serious systemic conditions—all classic features in pityriasis rubra, not commonly found in such combination in dermatitis exfoliativa.

Treatment.—As at least some cases are due to a toxemia, the general condition of the patient should be investigated thoroughly and treatment instituted to meet indications. Crocker,² Mook,³ Engman, and others report favorable results after the treatment of dermatitis exfoliativa with quinin in large doses. The tolerance in the cases reported by Mook was remarkable. As high as 85 grains per day were given without producing cinchonism. Arsenic is not recommended, except in rare instances. The internal treatment should be directed toward meeting any indication suggested by the general

¹ Loc. cit.

² Loc. cit.

³ Jour. Cut. Dis., 1908, xxvi, p. 408.

condition. Jaborandi, pilocarpin, and aspirin may give relief, and occasionally are of value. The patient should be given complete rest, preferably in bed. Formerly applications were used to relieve itching and to keep the skin softened. The dry treatment, as suggested by Engman,¹ appears to give good results. With this treatment the patient is simply kept covered day and night with a dusting-powder. For the first day or so, this is uncomfortable, but later becomes perfectly comfortable and involution of the lesions occurs more rapidly. In case oily or greasy preparations are found necessary, the simple unguentum aquæ rosæ, U. S. P., will be found useful; or Hebra's ointment, 1 part to 4 of vaselin, with from 5 to 10 grains (0.33-0.66) of salicylic acid to the ounce (30.) of the whole, is usually grateful to the skin. An ointment often employed with great advantage in these cases over the entire cutaneous surface is:

R—Sulphur. præcipit.,			
Acid. salicylic.,	āā	gr. ijss;	166
Bals. Peru.,		℥. x;	66
Ungt. petrolat.,			
Ungt. aq. ros.,	āā	℥ss;	15 M.

Other simple ointments and oils, with or without the addition of small amounts of salicylic acid, phenol, ichthyol, tar, or other remedies, may be of value. As a rule, mild preparations are more serviceable than the stronger remedies. One of the combinations of lime-water, olive oil, and zinc-oxid described in the treatment of eczema is occasionally of service. Emollient, starch, and hot baths are generally comfortable to the skin.

Prognosis.—In the majority of instances, the patient eventually recovers, though convalescence is protracted and delayed by frequent recurrences. A small proportion of cases progress to the formation of a universal exfoliative dermatitis, from which the patient rarely recovers. In grave and protracted cases, the general health of the patient suffers, and a fatal result may be expected. Bowen² reports seven cases, with a fatal issue in five.

Pityriasis Rubra (Hebra type).—**Synonyms:** Dermatitis Exfoliativa. Fr., Pityriasis rubra aigu.—Pityriasis rubra is a rare, chronic, and usually grave inflammatory cutaneous disease, involving, as a rule, the entire surface of the body, in which the skin, usually without infiltration, becomes deeply reddened and covered with fine scales. There is commonly no subjective sensation save that of chilliness, and the later symptoms, the sequelæ of the affection, are: shedding of the hairs, adenopathy, pigmentation, atrophy, and, as a consequence of pressure and friction effects, ulceration. The cutaneous manifestations are probably but symptoms of a systemic disease, which in the majority of cases terminates fatally.

Symptoms.—The disease is characterized by a superficial hyperemia and inflammation of the skin, declared in patches or by a diffuse red-

¹ Quoted by C. J. White, Jour. Cut. Dis., 1912, xxx, pp. 705-715.

² Loc. cit.

ness of a vivid or lurid tint, and by an abundance of small, lamellated, bran-like scales, which are continuously exfoliated from the epidermis throughout the course of the malady. Patients rarely present themselves for observation until a considerable portion of the body-surface is involved; but Kaposi states that in two patients observed by him the disease was first noticed in the neighborhood of the articulations. There is no vesiculation, pustulation, moisture, or crusts. The palmar and plantar surfaces are usually less distinctly reddened than the face and the extremities, having at times even a pallid hue, but they always present scaling.

Under pressure with the diascope, the redness subsides or assumes a yellowish shade; while, as a rule, when the integument is gathered up between the fingers and thumb, no infiltration can be recognized. Exceptions, however, have been noticed by several observers.¹ The temperature of the skin is slightly increased. The exfoliation, as the disease progresses, is one of its most striking characteristics, the scales accumulating in large quantities in the clothing of the patient, who is engaged, as a French writer has it, in the labor of stripping himself involuntarily of his epidermis.

The disease persists for months or for years, being always more severe in expression as it advances, the scales being shed more abundantly, leaving a smooth, shining, occasionally purplish, or even cyanotic, skin. In the patients observed by Jamieson² the skin was so dark-hued as to suggest the color of a mulatto. Gradually the patient becomes conscious of an increasing sense of chilliness, as though deprived of sufficient body-covering. Usually this is the only subjective sensation. Various grades of itching occur in certain cases, or there may be instead sensations of stiffness, burning, and tingling. Later, the integument seems to retract, as though it were insufficient to encompass the body, and becomes subject to fissure from extension and contact, while the lower extremities may be edematous. This retraction may be so marked that ectropion of the eyelids may ensue, the fingers may remain semiflexed, and wide opening of the mouth may become difficult. The skin over bony prominences becomes thin, stretched, and often fissured, or becomes the seat of superficial ulcers or gangrene. Thinning of the skin of the soles of the feet may render walking painful or impossible. The hairs and the nails lose their lustre and become friable, and the hairs often fall, though the nails may escape.

The influence of this epidermal exfoliation, involving, as it does finally, every portion of the body-surface, does not fail toward the end to be felt by the vital forces. Alternating chills and febrile processes, pneumonia of a low grade, colliquative diarrhea, tuberculosis, subcutaneous abscesses, bedsores, and even gangrene of the skin, may close the scene.

Hebra and Kaposi altogether had under observation twenty-one patients affected with pityriasis rubra, who, with a single exception,

¹ Pityriasis rubra: Chicago Med. Jour. and Examiner, February, 1881.

² Edinburgh Med. Jour., 1880, xxv, p. 879.

died from its effects. Cases have been reported in America by G. H. Fox, Duhring, Elliot,¹ Bowen,² Montgomery and Bassoe,³ Mook,⁴ Wallhauser,⁵ and others. We have had under observation several typical instances of the affection.

The disease is one of early or middle life, and affects preëminently the male sex. The progress of the disease is slow, lasting for years, though in a few instances it has proved rapidly fatal. The time required for extension to the entire surface of the body varies from a few days to two years or more, but averages from three to eight months. From the first, the tendency of the disease is to progress slowly to a universal atrophy of the skin. Involution of areas, or improvement of the cutaneous symptoms, is very unusual. The sweat may or may not be secreted in the course of the disease. The tongue is bright-red in the early stages; later it is covered with a brownish coat. It occasionally undergoes exfoliation. Rhagades may form, especially in the palmar and plantar regions. The chief systemic symptoms recorded are: languor, chilliness, and even severe rigors, alternating with febrile temperatures of recurrent type; albuminuria, diarrhea, pulmonary edema, icterus, interstitial pneumonia, bronchitis, rheumatism, and tuberculosis.

Etiology.—The causes of the disease are unknown. Petrini and Jadassohn⁶ showed that many cases were tuberculous.

A case of pityriasis rubra of the Hebra type reported by Mueller,⁷ accompanied by tuberculosis of the lymphatic glands, was more fully described, after the death of the subject, by Fabry,⁸ who concludes, after recognition of the existing tuberculosis, that the contention of Jadassohn and Doutrelepon respecting the tuberculous character of a large proportion of similar cases requires further confirmation. Halle⁹ is doubtful as to the existence of tuberculosis in a similar case reported by him. It must be conceded, however, that tuberculosis occurs frequently in cases of pityriasis rubra of this type. In Elliot's case¹⁰ general tuberculosis was demonstrated post-mortem, and he believes it to be secondary to the cutaneous disease. This view, with regard to many of the cases, was held by Montgomery.¹¹

Pathology.—Tschlenow¹² states that the primary changes occur in the epidermis, producing secondary inflammation in the cutis, which ultimately leads to complete atrophy of the skin. Hebra and Fleischmann discovered coincident pulmonary, intestinal, or cerebral tuberculosis. Kaposi described an atheromatous condition of the arteries. Myelitis was discovered post-mortem in one case by Jamieson, who

¹ Jour. Cut. Dis., 1897, xv, p. 35.

² Ibid., 1906, xxiv, p. 298.

³ Jour. Amer. Med. Assoc., July 6, 1912, p. 10; abstr. Jour. Cut. Dis., 1912, xxx, p. 645.

⁴ Pityriasis rubra of Hebra and its relation to tuberculosis (an exhaustive study, with bibliography and histology): Archiv, 1891, xxiii, p. 941, and *ibid.*, 1892, xxiv, pp. 85, 273, 463.

⁷ Archiv, 1907, lxxxvii, p. 255.

⁹ Ibid., 1907, lxxxviii, p. 247.

¹¹ Loc. cit.

³ Ibid., 1902, xx, p. 548.

⁴ Ibid., 1908, xxvi, p. 408.

⁵ Ibid., 1908, xxvi, p. 408.

⁶ Ibid., 1908, xxvi, p. 408.

⁸ Ibid., 1908, xxvi, p. 408.

⁹ Ibid., 1908, xxvi, p. 408.

¹⁰ Loc. cit.

¹² Archiv, 1903, lxix, p. 21.

has been followed by others in the recognition of central and peripheral neurotic alterations. Kopytowski and Wielowiczski¹ described cocci which they think are factors in producing the disease. The histology, as revealed in the researches of Hans Hebra,² demonstrates that in the earlier period of the disease there is an infiltration of the integument, moderate in degree, succeeded at a later period by cutaneous atrophy, in which the rete and papillæ of the corium disappear. The connective-tissue elements undergo sclerosis; and the glands and follicles of the skin are destroyed. Pigmentation is abundant. Petrini and Jadassohn³ reported inflammatory infiltration of the papillary and subpapillary layers of the corium, a proliferation of the connective-tissue cells, and secondary changes in the epidermis.

Diagnosis.—Many cases reported as instances of pityriasis rubra really belong to some other division of the dermatitis exfoliativa group. By recalling the characteristic symptoms, namely: the long duration, absence of infiltration, fineness of desquamation, the later atrophy of the skin, and ultimate fatal termination, a picture is presented that is characteristic and very different from psoriasis, eczema, and other disorders of this type.

Psoriasis rarely extends over the entire surface of the body, but at times it is generalized. In these exceptional forms a long history of the occurrence of typical psoriatic patches may be usually obtained; while the bleeding surface beneath the scales and the character of the latter will point to the true nature of the disease. Psoriasis occurs frequently in healthy, pityriasis rubra in cachectic, constitutions.

Extensive erythematous or squamous eczema, apart from other symptoms, can be recognized at once by the excessive distress occasioned by the eruption. In every case of generalized eczema, at one point or another, there always will be a surface which weeps. In the early stages of pityriasis rubra, the patient is not distressed with his disorder, but may have a listless expression. The scales are not scanty and adherent; they are abundant and exfoliate freely, and there is no history of moisture.

In its early periods, pityriasis rubra can be distinguished from pemphigus foliaceus by the absence of bullæ and of the intolerable stench which is often emitted by the sufferer from the latter disease. When, however, there is present merely a generalized exfoliative dermatitis, the two disorders may well nigh be indistinguishable.

Treatment.—Arsenic administered internally seems powerless in pityriasis rubra. Cases are recorded of fatal results after the administration of this drug in large quantities for long periods of time. Kaposi records a single patient relieved by the use of phenol internally. Thyroid extract has been suggested.

A roborant treatment, including the employment of cod-liver oil, iron or quinin, is generally indicated. Quinin, as recommended by

¹ Beitr. zur. Klinik und Pathologischen Anatomie der Pityriasis Rubra: Archiv, 1901, lvii, p. 33 (bibliography to date).

² Vierteljahr, 1876, Heft. 4, S. 508.

³ Loc. cit.

Engman and Mook, has been given a trial by us in some cases. The dose was progressively increased from the medicinal quantities usually given to 50, 60, or even 90 grains a day, care being taken that no ill effects occurred relative to the heart or ears. The tolerance of the drug was in all cases distinct and improvement marked.

Locally, the simplest are the best measures. Unguentum aquæ rosæ, U. S. P., petrolatum, lanolin, diachylon ointment, and various oily creams may be employed. In certain cases the continuous bath gives temporary relief; in others the dry treatment with dusting-powder suggested for the ordinary type of dermatitis exfoliativa is advised. The clothing should be ample and non-irritating, and the diet selected with a view to supporting the strength.

Prognosis.—The majority of all cases of pityriasis rubra of the Hebra type have terminated fatally.

Dermatitis Exfoliativa Neonatorum (*Keratolysis Neonatorum*. *Ritter's Disease*).—Under this title Ritter v. Rittershain¹ describes a rare exfoliating disease of the skin in nursing infants from six days to five weeks old, occurring most commonly in foundling asylums. The disorder begins usually as a reddened, exfoliating patch, most frequently on the lower part of the face, though it may appear first on any part of the body, and rapidly spreads until the entire surface is reddened and exfoliating. In some instances vesicles and bullæ appear early, a fact which led Richter and others to class the disease with pemphigus neonatorum. The angles of the mouth and the mucous outlets of the body frequently show fissures and are covered with crusts. Often the mucous membranes of the mouth, nose, and conjunctiva are involved. The surface of the skin beneath the scales is red, usually dry, and often excoriated. Occasionally, the surface is moist and crusted.

The duration of the disease varies. In most cases there is complete involution in from seven to ten days, with few or no constitutional symptoms. Severe cases may last a month or longer, with disturbance of the digestion and assimilation, and production often of marasmus. Pneumonia is of frequent occurrence. As the result of secondary infection, furuncles and abscesses are common; gangrene and sepsis may follow. When healing occurs, it is accomplished as a simple and gradual diminution of the erythema and cessation of the scaling. Recurrences are not uncommon.

Etiology and Pathology.—Ritter² believed in its pyogenic origin. In two cases studied by Hedinger³ the *Staphylococcus pyogenes aureus* was recognized on bacteriological examination, and the author concludes that dermatitis exfoliativa of the newborn is merely a malignant variety of the pemphigus of infants. Kaposi considered it an exaggeration of the normal exfoliation of the newborn. Brocq⁴ suggests that certain cases described as Ritter's disease may have been examples of pemphigus, and states that Behrend regards it as analogous to pem-

¹ Central-Zeitung f. Kinderheilk., 1878, Bd. ii, and Vierteljahr, 1879, vi, p. 129.

² Loc. cit.

³ Archiv., 1906, lxxx, p. 349.

⁴ Le Traité élémentaire de Dermatologie pratique, ii, p. 254.

phigus foliaceus of Cazenave. Caspary¹ considered it a form of epidermolysis. Histological examinations² show merely a superficial inflammation, often with free exudation and excessive exfoliation of the epidermis. Skinner³ sums up his histological findings as follows: Dilatation of the blood-vessels in the corium and hypoderm, edema of the prickle-cell layer of the epidermis, and the lifting up *en masse* of the horny layers of the epithelium from a rapid exudation of serum, tending to collect in lakes. Hazen⁴ describes a high leukocyte count (45,000) and the finding of the *Staphylococcus albus* in fresh vesicles.

Diagnosis.—Dermatitis exfoliativa neonatorum is likely to be confused with pemphigus neonatorum, and rarely with general exfoliative dermatitis due to syphilis. The differentiation between the first two is difficult, and, in fact, the former appears to be a variety of pemphigus neonatorum so called, the latter having recently been proven to be an impetigo of streptococcic origin. From a general exfoliative dermatitis associated with syphilis it may be differentiated by other signs of syphilis which are usually present. A close resemblance between the two has been noted by the author.

Treatment.—The nutrition of the child should be sustained with proper feeding, and the warmth of the body maintained. Locally, the surface should be kept covered with a soothing oil or soft ointment, and great care should be taken in changing the dressings not to damage the sensitive skin.

Prognosis.—The prognosis is unfavorable, as about 50 per cent. of the infants affected with the disease die, the outcome depending largely upon the strength and vitality of the child.

Epidemic Exfoliative Dermatitis (*Epidemic Skin Disease* (Savill), *Savill's Disease*).—During the summer and autumn of 1891 an epidemic disorder with cutaneous symptoms developed in several London asylums, infirmaries and hospitals, affecting about 500 patients. The disease was studied with special care by dermatologists and other medical men. The brief sketch given below is based upon an excellent monograph, with colored and photographic illustrations, by Savill,⁵ on various communications made on the subject in the columns of the *British Medical Journal* and the *London Lancet* for 1892, and on the description given by Crocker in his treatise. American cases have been recorded by Fordyce,⁶ and Winfield.⁷

The disease occurred in two distinct clinical types: one with catarrhal exudation from the skin, resembling the moist forms of eczema; the other dry and non-discharging, resembling pityriasis rubra, and, according to Crocker, indistinguishable from that disease.

The eruptive features were apparently not preceded by prodromata,

¹ Vierteljahr, 1884, p. 122.

² Winternitz, Archiv, 1898, xlv, p. 397; Lutheln, ibid., 1899, xlvii, p. 323; and Mraček's Handbuch, Bd. i, p. 757 (full bibliography).

³ Brit. Jour. Derm., 1910, xxii, p. 75.

⁴ Jour. Cut. Dis., 1912, xxx, p. 325.

⁵ Jour. Cut. Dis., 1897, p. 141.

⁶ Loc. cit.

⁷ Ibid., 1898, p. 73

but gastro-intestinal disturbance (vomiting, diarrhea), and in some cases sore throat, either preceded or accompanied the appearance of the dermatosis. Except in patients of advanced years, there was usually post-occipital and cervical adenopathy, not to be explained as sympathetic with a cephalic eruption. The regions most frequently involved were the upper limbs, the scalp, and the face; the lower limbs less frequently.

The skin lesions were pruritic, and were irregularly grouped, acuminate papules, with a follicular site. The face and upper extremities were more extensively invaded than the lower extremities.

The stages of the exanthem, as given by Savill, were:

(a) A papulo-erythematous stage, lasting from three to eight days, in which shot-like papules could be felt beneath the skin. These were discrete, and seated on a reddened, thickened, even an indurated or edematous, integument. In some cases the onset was in the form of marginate and circular nodose patches, resembling those seen in erythema nodosum. A few cases resembled ringworm, the flattened papules enlarging to a circinate annular group, with minute central vesicles, which were readily ruptured.

(b) An exudative stage, lasting from three to eight weeks, in which macules, vesicles, or papules soon formed a confluent eruption, the skin being of crimson hue, thickened, and scaling in flakes or in lamellated crusts in consequence of the exudation. In the moist type the papules developed to vesicles with exudation; in the dry type the exfoliation occurred in pure scales, pints of which, in some cases, could be collected from a patient's skin in a day. In other cases this exfoliation was in the form of an impalpable powder. This was characteristic of all well-marked cases.

(c) A stage of subsidence, in which the disease proceeded to involution, leaving the skin at first indurated, polished, and brownish in color. In many cases the new skin was raw and parchment-like, smooth, shining, and readily fissured, resembling in this respect ichthyosis. In a few instances, ectropion resulted, as a sequel of conjunctivitis. In severe cases the hair and all the nails were shed. Complications occurred with pneumonia, gangrene, and albuminuria. A few of the attendants upon the sick (children and patients of somewhat older years) were attacked; but for the most part the patients, and especially those succumbing to the disease, were individuals of advanced years of both sexes, inmates admitted for the management of other disorders to the institutions in which the disease prevailed.

Etiology and Pathology.—The cause of the disease was not satisfactorily determined. Savill and Russell¹ isolated a diplococcus from vesicles and scales which resembled the *Staphylococcus pyogenes albus*, but differed culturally, in that it did not liquefy gelatin, and experimentally in its effect on inoculated animals. Its etiological importance is not settled.

¹ Brit. Jour. Derm., 1892, iv, p. 105.

Echeverria¹ described the histology, laying stress on the presence of a peculiar change in the nuclei of the prickle-cells (peridiaphania), which he considered pathognomonic. The remainder of the changes described were in the main those found in a superficial dermatitis, including cellular infiltration in the cutis, hypertrophy of the rete, and parakeratosis with scaling.

Treatment.—Treatment, on the whole, was unsatisfactory. Local parasitocides were beneficial to a degree. Crocker recommended the treatment employed in other cases of dermatitis exfoliativa.

Prognosis.—There was a mortality of from 5 to 13 per cent., death resulting from exhaustion, with the usual signs of subsultus, shallow respiration, and coma.

LICHEN RUBER.

Under the term *Lichen Ruber*, Hebra² was the first to describe the disease which corresponds closely to the disorder described in these pages as pityriasis rubra pilaris. Most of Hebra's cases, however, were associated with grave systemic conditions, and twelve out of fourteen terminated fatally. Kaposi later described a lichen ruber acuminatus, which he stated is identical with the lichen ruber of Hebra, though in his cases the general health of the patient was not seriously affected. He divided these cases into two groups, the acuminate and plane. Confused with these cases were those described by Wilson as lichen planus.

The relationship of the various diseases under consideration has been the subject of much discussion. At a dermatological congress held in Vienna, in 1892, a patient was exhibited who, Kaposi stated, was suffering with lichen ruber acuminatus, while Vidal, Hallopeau and other Frenchmen declared it to be a case of pityriasis rubra pilaris. Critical comparison of the literature and illustrations of the subject remove all doubt that pityriasis rubra pilaris (Devergie) and lichen ruber acuminatus (Kaposi) are one and the same disease. Hebra's lichen ruber, judging from Kaposi's statements and from two plates published by Hebra (to which Crocker calls attention), was probably a severe form of the disease. A few German authorities still teach that pityriasis rubra pilaris is wholly distinct from lichen ruber, which they subdivide into lichen ruber acuminatus and lichen ruber planus. Instances are cited by Kaposi, Neumann, and others in which the acuminate and the plane papules coexisted in the same individual. These few cases are probably coincidences or modifications of usual types, and lichen planus is generally held to be an entirely independent disease.

PITYRIASIS RUBRA PILARIS.

Synonyms.—Lichen Ruber (Hebra); Lichen Ruber Acuminatus (Kaposi); Lichen-Psoriasis (Hutchinson); Pityriasis Pilaris (Devergie). Fr., Pityriasis rubra pilaire.

¹ Brit. Jour. Derm., 1895, vii, pp. 9–16.

² Diseases of the Skin, New Sydenham Society translation, 1868, p. 57.

Definition.—Pityriasis rubra pilaris is a chronic, mildly inflammatory, exfoliating disease of the skin, in which the characteristic lesions are fine, acuminate, firm papules situated at the mouths of hair-follicles, and displaying at the apex a horny plug or scale, which dips into the follicle. By coalescence the papules form reddened, scaling areas, which may spread and cover the entire surface of the body. This affection has been described chiefly in France by Devergie,¹ Besnier,² Richaud,³ Brocq, and others. The Museum of the St. Louis Hospital, Paris, is provided with illustrations in wax of every phase of the malady.

FIG. 71



Pityriasis rubra pilaris.

Numerous examples of the disease have come under the observation of experts in America. The malady is undoubtedly identical with lichen ruber acuminatus of Kaposi.

Symptoms.—The disease usually begins insidiously, but may appear more or less suddenly, with or without mild systemic disturbance. As a rule, the characteristic papules ("projecting cones") are not seen until after a period in which the disease appears as a seborrhea sicca of the scalp, with or without palmar and plantar scaling patches. The disorder may appear first on the face (nose, brow, lips, chin), as a

¹ *Traité pratique des Maladies de la Peau*, 1857, 2d Ed., p. 454.

² *Annales*, 1889, s. ii, x, pp. 253, 398, 485.

³ *Thèse de Paris*, 1877.

fine pityriasis, or as a condition simulating seborrhea sicca. A similar fine desquamation may be present on the ears, neck, and other parts of the body before the appearance of papules, but as a rule the latter appear on one or more regions soon after the first evidence of the disorder and gradually extend to other portions of the body. The scales are seated at the follicular orifices; are thin, whitish, grayish, or heaped up in large discoid masses; are dry, firmly attached, friable, and in cases suggest the "crackle-ware" of the potteries. The disease is usually well marked over the extremities and on the back of the neck,

FIG. 72



Pityriasis rubra pilaris.

but may involve any or all portions of the body. Occasionally, in the acute type of the disorder, a large number of isolated papules appear somewhat suddenly over several regions, producing a condition simulating goose-flesh.

The characteristic papules are minute, acuminate, hard, dry, and of a color varying from that of the normal skin to the different shades of pink, rosy-yellow, or duller hues. They are situated at the hair-follicles and each is pierced by a hair. At the apex of the papule, and

surrounding the hair, is a horny sheath, which penetrates the hair-follicle for a short distance. Fine lanugo-hairs which pierce the papules may be recognized on close inspection; the whitish, horny plugs then giving the lesions a scale-capped appearance.

The papules become more and more numerous, and appear at times to coalesce, but may form patches, at times symmetrically disposed, covered with fine elevations, conical and discrete; or they may become round, flatter, and coalesce so completely as to be lost in the general scaling, exfoliating, erythematous, and lucent area. The yellowish-red or deep-reddish patches may be the seat of pityriasis scaling, or may exhibit separation of the epidermis in large, adherent flakes, which,

FIG. 73



Pityriasis rubra pilaris.

especially over the elbows and the knees, present the appearance of psoriasis. When the infiltration is moderate, the intensifying of the natural lines of the skin is a conspicuous feature. The areas are irregular in size and shape, but frequently have an angular or oblong outline. Commonly at the borders of these patches are found the initial papules of the affection, still isolated and surrounding characteristic stumps, filaments, or black points of hairs, enabling one thus to make the diagnosis with ease.

When discrete papules are grouped closely, and in areas formed by aggregation rather than by complete coalescence of the papules, a "nutmeg-grater" effect is produced when the finger is passed over them. At times the eruption is generalized; when the face chiefly is

involved, the slight crusts formed are decidedly of the type of those described under dermatitis seborrhoica. In many cases the tension of the dry, infiltrated skin produces ectropion of the lower eyelid. Occurring over the hairy scalp, the accumulated scales and crusts may form a dense and resisting cap, which is difficult to remove. The nails are usually grayish, yellowish, transversely striated, and roughened. There may also be a coincident polytrichia. Important for purposes of diagnosis are the little horny, blackish, conical papillæ occupying the site of the hair-follicles on the dorsal surfaces of the first and second phalanges of the fingers. These usually remain distinct even when, on all other parts of the body, their identity has been lost in the general exfoliative process. Sometimes an exceedingly characteristic feature of the disease is displayed in the face, which on inspection seems to be covered with a more or less firmly attached, irregularly creased, mortar-like plaster, the "cast" being conspicuously evident on the tip and root of the nose, the lower brow, the lips, and the chin. When the palms and soles are involved, they become the seat of a firm, thick, lamellar hyperkeratosis, reddish-yellow in hue, furnishing a "keratodermic sandal" (Besnier) for the sole.

The course of the disease is usually chronic, irregular, and subject to relapses and to unexpected exacerbations. The disease has a tendency to become generalized, and even universal, and to persist indefinitely. Periods of remission or of complete clearing of the skin are noted in a few instances, but the disorder usually returns. Of the score or more cases that have come under our observation, in five only have we seen the skin become entirely free from evidences of the disorder, though in most of the cases improvement was noted for varying periods. Of the five cases, one, a rather severe case, has now remained well for four years. In two, after periods of freedom from the disease varying from a few months to five years, the cutaneous symptoms recurred, but not in severe type. In the other two the disease was acute in its onset, becoming almost universal within ten weeks from its appearance. In one of these patients, who acquired syphilis soon after the appearance of pityriasis rubra pilaris, the latter disappeared entirely in five months from its onset and had not recurred at the end of nine years, when the patient died as the result of an accident. The other was entirely relieved at the end of nine months, but his subsequent history is unknown.

Subjective sensations may be entirely absent, though there is usually a sense of dryness and of contraction of the skin. There may be more or less itching, though, as a rule, this is not marked. In the earlier stages, at least, the general health appears to be unimpaired, even when the disorder is generalized. Eventually, however, in some cases there is more or less failure of general nutrition, leading in rare instances to a fatal result.

Etiology.—The cause of the disease is unknown. It commonly begins in the second decade of life, but has been observed in all ages, somewhat more often in men than in women. Cases are reported at

the age of one and one-half years,¹ two and one-half years,² and at three years.³

Milian⁴ regards tuberculosis as the etiological factor. De Beurman, Bith, and Heuyer⁵ report four cases in one family, two males and two females, the ages ranging from twelve to twenty-eight years, three of them having apical phthisis.

Pathology.—The definite pathogenesis of the disorder is unknown. The theory of its being a toxic process due to the bacillus of tuberculosis or other such agent has been advanced. The histopathology, as given by Jacquet in Besnier's cases,⁶ Taylor,⁷ Heidingsfeld,⁸ Hartzell,⁹ Heller,¹⁰ and others, shows that the papule which is the essential lesion of the disease is formed by a hyperkeratosis of the superior portion of the hair-follicle, and that there is a hyperkeratosis of the entire epidermis in addition, and a mild inflammatory process in the corium, probably secondary to the epithelial changes. German cases, under the name of *lichen ruber acuminatus*, have been studied by Hebra, Kaposi, Neumann, Biesiadecki, Joseph, and others. Different reports vary considerably, depending, probably, upon the age of the lesions examined. The pathological processes correspond closely to that described above, except for a more pronounced inflammation in the corium, as the result of which Kaposi and others believe the epithelial changes to be secondary to an inflammation of the corium.

Diagnosis.—The disease is to be differentiated from all others by the characteristic papule pierced by the shaft, or segment of shaft, of a hair. In extensive cases of long standing the identity of the papules may be lost in the general desquamation over most of the body; but in nearly all cases lesions can be recognized on the backs of the fingers, as described above.

From lichen planus the diagnosis is not difficult in the early stages, or when individual papules are found bordering the larger areas. The dull-crimson or violaceous hue of patches of lichen planus is characteristic. Moreover, the disease is rarely so generalized as pityriasis rubra pilaris. Keratosis pilaris is limited, as a rule, to the regions which it chiefly affects, the extensor faces of the limbs. Ichthyosis is commonly congenital, the first lesions developing soon after birth. In psoriasis the characteristic silvery-white, imbricated scales, the bleeding points beneath, and the larger size of the primary lesions will usually establish the diagnosis. In pityriasis rubra (of Hebra) the history of the disease, the absence of distinct papules and of infiltration, and the appearance later of atrophy of the skin are distinctive features. It

¹ Whitehouse, J., Jour. Cut. Dis., 1912, xxx, p. 482.

² Rasch, Centralb., 1899, i, p. 199.

³ Heller, Zeitschrift, 1903, x, p. 153 (with histological study).

⁴ Annales, 1906, s. iv, vii, pp. 1067-1075.

⁵ Ibid., December, 1910, p. 609; abstr. Brit. Jour. Derm., 1911, xxiii, p. 165.

⁶ Loc. cit.

⁷ New York Med. Jour., January 5, 1889, p. 1.

⁸ Jour. Cut. Dis., 1906, xxiv, p. 371.

⁹ Stelwagon's Diseases of the Skin, 7th Ed., p. 234.

¹⁰ Loc. cit.

must be remembered that rarely pityriasis rubra pilaris may terminate in a generalized exfoliative dermatitis, which cannot be distinguished from the same process arising in psoriasis, eczema, or other scaling affections (see Dermatitis Exfoliativa).

Treatment.—Systemic treatment should be varied to meet the indications in each individual. In many cases tonics, cod-liver oil, and an especially nutritious diet are indicated. Crocker praises thyroid extract, beginning with 5 grains (0.33) and gradually and continuously increasing. Arsenic has given excellent results in some cases, but in a large number has failed; and apparently in a few instances has aggravated the disorder. We have had marked amelioration of the symptoms following the combined use of arsenous trioxid, grain $\frac{1}{20}$ (0.0033), and protiodid of mercury, grain $\frac{1}{6}$ (0.01), three times a day, together with external applications.

The local treatment corresponds closely to that of psoriasis, squamous eczema, and other exfoliative conditions. The daily use of an ointment containing from 5 to 20 grains (0.33–1.3) of salicylic acid to the ounce (30.) of vaselin, or of equal parts of vaselin, lanolin, and olive oil, is often of value in keeping the skin soft and relieving the itching when present. For markedly thickened areas, ointments containing salicylic acid in strength of 20 to 60 grains (1.33–4.) or more to the ounce (30.) may be used; or some of the preparations of chrysarobin, resorcin, oil of cade, or ichthyol recommended for the treatment of psoriasis. Fatty crusts, when these are abundant, are to be removed by shampoos, as in seborrheal affections of the scalp.

Prognosis.—The prognosis is unfavorable with respect to the cutaneous manifestations, as in those cases in which the disorder disappears temporarily it almost invariably recurs. The tendency of the disease is to persist indefinitely. The general health may be unimpaired, but is affected sooner or later in many instances. The issue in exceptional cases may be fatal.

LICHEN PLANUS.

Synonyms.—Lichen Ruber Planus, Lichen Psoriasis.

Definition.—Lichen planus is an inflammatory dermatosis, in which are displayed multiple, small, flat-topped, angular or polygonal papules, often exhibiting a color containing various shades of crimson or purple, the plane apex of each being usually flat or depressed and covered with a horny film. This disease was first described by Erasmus Wilson, in 1869. The disorder is of frequent occurrence, though it is not one of the common diseases of the skin. It is usually chronic, but may be acute, and, although in most instances limited in distribution, it may be extensive and even generalized.

Symptoms.—In a typical case of lichen planus, the primary lesions are pinpoint- to pinhead-sized, angular or polygonal, flat papules. These are sharply defined and covered, not with a scale, but with a thin, transparent, horny filament, which gives to the lesions a waxy or varnished appearance. As the papules increase in size, they retain

their angular or polygonal outline and remain flat, or may become slightly umbilicated. The bases are angular or rounded and the sides precipitate. The greatest diameter attained by any individual papule is about one-half that of a small split-pea, but by coalescence the

FIG. 74



Lichen planus.

original lesions may form larger areas, which are also angular, linear, or polygonal in outline, and are sharply defined from the surrounding skin. On the patches the thin, horny covering may be partially broken up into fine, closely adherent scales. The color of recent lesions is a

FIG. 75



Lichen planus. (Fox.)

bright crimson, that of the older a purplish or reddish purple. On the surface of the papules may be seen on close inspection minute whitish points and lines, to which Wickham has called attention ("Wickham's striæ"). When the eruption is plentiful, the violaceous color is char-

acteristic, and the peculiar shining or glistening top observed when viewing the lesion in a position where the light falls aslant upon the surface is also characteristic. As the lesions grow older, the shade deepens to a dull purplish or darker color. Involution of the papules often leaves a pigmentation of a smoky, sepia, or even blackish, hue, which is naturally most conspicuous and most persistent on the lower extremities. Occasionally, white, atrophic-looking spots are left, which ultimately disappear.

The lesions may be discrete and isolated, or irregularly grouped, but when numerous they tend to multiplication and aggregation and form irregular, linear, angular, or polygonal patches, with sharp outlines. Annular or circinate patches may occur. Rarely combinations of lines and circinate groups form exceedingly odd-looking figures—parallel lines, cockades, scaling crests, rings, or rosettes. The shape of the patch may be determined by an external irritation, such as a scratch-mark.

When the papules coalesce and lose their identity, a crimson-hued sheet or mask of the skin is seen, generally characterized not merely by the color of the lichen planus papules, but also by a silvery sheen, due to thin, shining scales, which do not completely cover, but which supplement, as it were, the empurpled patches beside and over which they form. The scales are not freely shed from the surface, but are attached firmly. When there are decided sheets of infiltration, they are most conspicuous over the flanks and anterior part of the trunk; but they may also be seen elsewhere, as, for example, over the extremities. When the patch is undergoing involution, the scaling ceases, the infiltration subsides, and a pigmentation somewhat similar to that described in connection with the papules follows.

The disease, though usually limited to a few regions, particularly the flexor surfaces of the wrists and forearms, and the legs immediately above the ankles, is symmetrical as a rule, but may appear on one side only of the body and may cover large areas, and, in rare instances, the entire surface. The disease is seldom seen on the face or scalp, and is unusual on the palms or soles.¹ The nails may be involved and present lesions similar to those seen in psoriasis and eczema.

The greatest variation is experienced in the way of subjective sensations. Itching may be moderate or severe. In acute generalized cases the suffering of the patient is extreme. The eruption of lichen planus, however, is scratched much less often than that of other cutaneous diseases characterized by itching.

The course of the disease is chronic, and when untreated it may last for months or years, either through persistence of the original papules and areas, or, what is more frequent, by the successive appearance of new lesions. Occasionally, the disease disappears spontaneously, but its tendency is to persist. The disorder may recur, but recurrence is an exception to the rule.

¹ Dubreuilh and LeStrat, *Annales*, 1902, s. ii, iii, p. 209.

Occasionally, lichen planus may begin as an acute exanthem and become generalized in a few days, or even within twenty-four hours. In such cases the lesions are usually minute, of bright color, and exhibit no tendency to definite grouping. There may be coincident febrile symptoms and mild systemic disturbance, or severe concomitant disorders, such as pemphigus, diabetes, syphilis, and grave ulceration.¹ These acute symptoms may develop in an individual previously free from all evidences of lichen planus, but more commonly in those who have exhibited for months or years one or more areas of the disease, which then may run an acute course of a few weeks, yielding readily to treatment, or may persist as a generalized or localized chronic form. A number of variations from the usual clinical types occur.²

Vesicles at the summit of some of the papules and bullæ occur in a number of cases of lichen planus, most frequently in patients who have been taking arsenic, but also in others who have taken no arsenic prior to the appearance of the lesions. Trautmann³ has described a case in which pemphigus appeared to follow an attack of lichen planus. Whitfield,⁴ in presenting a patient, analyzed 17 previously reported cases, in 9 of which the patient had taken no arsenic prior to the appearance of the bullæ. He states that the presence of bullæ apparently has no bearing on the severity or prognosis of the disease. Hartzell,⁵ Allen,⁶ and others report similar cases.

Lichen planus is of rare occurrence in children. Crocker, Liveing, and Colcott Fox⁷ all report a spurious form, which the author first named believes to be a subsiding stage of papular or vesicular miliaria rubra. The lesions in children differ in no essential from those found in adults.

Occasionally, the lesions of *lichen pilaris seu spinulosus* (Crocker) are found in association with those of lichen planus in certain cases.

As a rule, the general health is not involved, save when the itching is so severe as to interfere with the patient's sleep or rest. Crocker refers to generalized cases in which the health was affected profoundly, a few of which terminated fatally. In this country one such case has been reported by Fordyce.⁸ It may be that the severe systemic disorders present in some of these cases were independent of the lichen planus.

Lesions of a different type from those depicted above, occurring with the ordinary types as well as independently, and which are now admitted to be forms of lichen planus, have been described under various titles.

¹ Johnston, Jour. Cut. Dis., 1907, xxv, p. 86; Galloway, Brit. Jour. Derm., 1906, xviii, p. 66.

² Crocker, Brit. Jour. Derm., 1900, xii, p. 421 (with discussion before the London Dermatological Society).

³ Zeitschrift., 1906, p. 317.

⁴ Brit. Jour. Derm., 1902, xiv, p. 161.

⁵ Jour. Amer. Med. Assoc., July 20, 1907, p. 225.

⁶ Jour. Cut. Dis., 1902, xx, p. 260.

⁷ Brit. Jour. Derm., 1891, iii, p. 201.

⁸ Jour. Cut. Dis., 1899, xvii, p. 56.

Lichen Planus Hypertrophicus¹ is a special form occurring usually on the lower extremities, occasionally on the upper, in which the lesions, after long persistence, have lost their ordinary characteristics and formed thickened, elevated patches. The patches, which are of varying size, may be rounded, elongated (band-like), or irregular, and present a reddish-brown or purplish color. They are covered with fine, adherent scales and horny projections, giving the lesions a warty appearance (*lichen planus verrucosus*). At times acuminate or conical horny papules occur, which by coalescence produce large patches. Commingled with these are sepia-brown pigmented spots, and at times atrophic areas. Itching is severe and persistent, and the lesions are aggravated by the trauma inflicted by scratching.

Lichen Planus Obtusus is a term applied to a form in which rounded or oval, flat or slightly convex papules of large size (pea to bean or larger) occur, situated chiefly on the arm or forearm. These may occur independently or in association with the ordinary types.

Lichen Planus Linearis.²—The tendency of lichen planus papules to form linear groups or bands may be exaggerated to produce this type. In such cases a narrow fillet of typical lesions may extend from the heel to the trunk along the line of the sciatic or other nerve, or, more frequently, from the buttock to a few inches below the knee. Such a case has been under our observation. A similar arrangement of the lesions may occur along the course of the nerves of the upper extremity or on the trunk. Again, the bands may be absolutely straight and apparently independent of the course of any nerve. Galloway³ has reported a striking example of this type, and we have had a similar case, but less extensive, on the outer surface of the thigh and leg.

Lichen Ruber Moniliformis is a title given a rare form of the disease, described in 1886 by Kaposi.⁴ Rowe, Dubreuilh, Gunsett,⁵ and others have reported similar cases, in which numerous node-like masses are arranged in lines and bands resembling a necklace of beads, with flat-tish, punctiform papules, and macules of a sepia-brown hue between the nodes. (A case of lichen ruber moniliformis was shown by Dr. Hyde before the Chicago Dermatological Society in the year 1903.)

Lichen Planus Annularis is that form of the disease in which the papules, while extending peripherally, leave a clear or clearing centre, and form thus circular patches in thin rings or bands, at times coalescing in polycyclic outlines. The patches may be few or numerous; the rings faintly or very distinctly outlined; the component parts of the ring, the characteristic papules of lichen planus, either readily

¹ Fordyce, Jour. Cut. Dis., 1897, xv, p. 49; Corlett (quoted by Fordyce, loc. cit.); Lieberthal, Jour. Amer. Med. Assoc., January 11, 1902, p. 93 (histology); Ravogli, Jour. Cut. Dis., 1904, xxii, p. 573 (histology).

² Cf. Heller, loc. cit., with reference to previously published cases of this type; and Whitfield, Brit. Jour. Derm., 1906, xviii, p. 221.

³ Brit. Jour. Derm., 1900, xii, p. 206.

⁴ Vierteljahr, 1886, p. 571.

⁵ Archiv, 1902, ix, p. 179 (with histological report and bibliography).

distinguishable or so fused as to render their identification difficult. Most English dermatologists¹ believe the annular lesion is formed by the fusing of individual papules rising in a ringed arrangement. Cavafy² asserted that in addition to this form of development certain annular lesions were formed by the peripheral extension, with central involution, of a single papule. Engman³ confirmed Cavafy's view by proving, both clinically and histologically, that annular lesions are developed by both of the methods above outlined.⁴

FIG. 76



Lichen ruber moniliformis.

Lichen Planus Erythematosus.—Under this title Crocker describes two cases in which the papules were of a deep crimson tint, soft to the touch, and obliterated temporarily by pressure. There was in both a marked telangiectasis of the face. Crocker mentions a similar case reported by Stirling.

¹ Brit. Jour. Derm., 1900, xii, p. 421.

² Jour. Cut. Dis., 1901, xix, pp. 209-222.

⁴ Cf. Sutton, Jour. Amer. Med. Assoc., 1914, lxii, p. 175.

³ Loc. cit.

Lichen Planus of the Mucous Surfaces (tongue, inner surfaces of the cheeks, lips, epiglottis, glans penis, progenital region of both sexes, anus, and perianal region) may occur with or without cutaneous symptoms. In some cases of well-marked cutaneous disease the mucous membranes are so slightly affected and attract so little attention that they are overlooked. Dubreuilh¹ believes that more cases of involvement of mucous membranes occur without cutaneous lesions than of the last-named without mucous symptoms. Confusion has been bred in these cases by the hastily formed conclusion that the lesions here discussed are mucous patches or symptoms of leukokeratosis buccalis.

Pinhead- to hemp-seed-sized, grouped or isolated, slightly projecting, velvety, smooth, grayish, whitish, rounded lesions may be recognized as lesions of lichen planus of the mucous surfaces, the color and

FIG. 77



Lichen planus of the mucous surface of the tongue.

size varying somewhat with the individual, the age of the disorder, and the locality involved. Sometimes a slight halo surrounds the base of each; at times they are firm, at others soft to the touch. Again, they may send short ramifying striæ to the neighboring mucous surface. Vörner,² and others describe umbilication of the lesions. As distinguished from purely cutaneous lesions, they may be smeared with a whitish mucus.

Lichen Planus Sclerosus et Atrophicus (Hallopeau) and **Lichen Planus Morphemicus (Crocker)**, a rare form of the disease, has been described

¹ *Histologie, Lichen plan des Muqueuses*, Annales, 1906, s. iv, vii, pp. 123-129.

² *Zeitschrift*, 1906, xiii, p. 107; abst. Annales, 1907, s. iv, viii, p. 145.

in addition by Marrant Baker and Stowers in England, and by the author,¹ Schamberg and Hirschler,² and Sutton in this country. The characteristic lesion found in this variety is an irregular, often polygonal, flat-topped, white papule. The white color of the lesions is striking, and has been compared with that of ivory and mother-of-pearl. The papules, as a rule, are firm to the touch, neither elevated nor depressed, but slight elevation may be present. Generally, no areola is present, but at times a rosy or moderately pigmented zone may surround the papules. These may be discrete or grouped, and in most cases present both types. When grouped to form plaques, the outline of the individual papules forming the plaques can be determined. Each papule has on its shining, smooth surface from one to several black or dark, horny, comedo-like plugs, or minute bead-like depressions, which show the former sites of horny plugs. These elements are situated at the pilosebaceous or sweat-pore orifices, and are important from the view-point of diagnosis.

FIG. 78



Lichen planus atrophicus.

Etiology.—The causes of lichen planus are obscure. It is often difficult to recognize the sources of the disease, but in many cases a history of nervous exhaustion can be obtained. Grief, long-continued anxiety, and overwork, especially when accompanied by great mental strain, frequently precede this disorder. Acute and aggravated cases have presented themselves before us in several instances following a great shock. On the contrary, many patients are well-nourished and not lacking in flesh. In fact, the combination of a fair degree of nutrition of the body with nervous exhaustion is to be frequently recognized in patients affected with lichen planus.

D. W. Montgomery and Alderson³ suggest that the disorder is due

¹ Jour. Amer. Med. Assoc., September 10, 1910, p. 901 (report of 6 cases, with a review of the literature).

² Ibid., 1909, p. 369.

³ Ibid., October 30, 1909, p. 1457.

to a toxemia. Fordyce¹ comes to the same conclusion in regard to his fatal case. Engman and Mook² suggest that lichen planus may be due to some constitutional disturbances caused by an infectious microbic agent. Numerous observers have reported the occurrence of two or more members of a family affected with the disease, several examples having come under our own observation.

Other causes cited are: traumatism (dog bite, Walters), digestive disturbances, malaria, malnutrition, and diseases of the generative organs. Within a year we have seen a patient whose attack of lichen planus followed the bite of a black ant. The lesions began shortly after the bite, which occurred upon the thigh, and spread in a band-like arrangement for some weeks, after which they developed pretty generally over the body.

Lichen planus is more common after the second decade of life, and is rare in children. Different opinions are entertained respecting the frequency with which men and women are attacked. General experience points to the conclusions formulated by Crocker, who reports more cases among women (English) than among men, while the statistics of the Vienna school reverse the figures. The disease is encountered more frequently in private practice, among the nervously taxed of the well-to-do classes, than among out-patients of public charities, who suffer to a greater extent than others from cachexia and malnutrition. Hoffmann³ reports the coexistence of lichen planus with diabetes. We have made a similar observation.

The fact that lesions develop along scratch-lines in predisposed individuals leads Jacquet to state that lichen planus is always traumatic, and found in individuals with a diminished vasomotor tonus, resulting from some disturbance of the nervous centres. Hallopeau and Jomier,⁴ on the other hand, bring forward as evidence of the parasitic origin of the disease a case in which lichen planus developed along scratch-marks in an individual who never had had the disease. A similar case was reported by West,⁵ in which the scratch-marks were produced by a cat.

Pathology.—The genesis of the disease is not fully explained. Many observers believe that lichen planus is a constitutional disease with cutaneous manifestations, produced by an unknown toxic agent acting on the nerve-centres. Robinson⁶ first clearly showed the pathological distinction between lichen ruber and lichen planus. His observations have been confirmed by those of Boeck, Kaposi, Touton, Weyl, and others. Among reporters on the histopathology of the disease may be mentioned Crocker, Török,⁷ Joseph,⁸ Pinkus,⁹ Fordyce,¹⁰ Engman,¹¹ Sabouraud,¹² and others.

¹ Loc. cit.

² *Annales*, 1906, s. iv, vii, p. 420.

³ *Brit. Jour. Derm.*, 1897, ix, p. 162.

⁴ *Jour. Mal. Cut.*, 1889, s. vi, i, p. 162 (with bibliography).

⁵ *Archiv*, 1897, xxxviii, p. 3.

⁶ *Ibid.*, 1902, lx, p. 163 (3 plates and references to literature).

⁷ *Jour. Cut. Dis.*, 1910, xxviii, p. 57.

⁸ *Annales*, October, 1910, p. 491; abstr. *Brit. Jour. Derm.*, 1911, xxiii, p. 164.

⁹ *Interstate Med. Jour.*, June, 1909.

¹⁰ *Ibid.*, 1903, s. iv, iv, p. 352.

¹¹ *Jour. Cut. Dis.*, 1889, vii, pp. 41, 81.

¹² Loc. cit.

The histopathology of lichen planus is characteristic and shows unusual uniformity in all types, notwithstanding the wide variation in clinical appearances. In all cases there is found a well-defined cellular infiltration in the upper part of the corium, consisting chiefly of connective-tissue cells and lymphocytes, associated with edema. In the epidermis hypertrophy is noted, as evidenced by acanthosis, hyperkeratosis, with associated edema, and occasionally a few migrated leukocytes. In detail, there is dilatation of the vessels and lymph-spaces of the papillary and subpapillary region, with edema, and a sharply outlined cellular infiltration, consisting chiefly of connective-tissue cells and lymphocytes. Occasionally, plasma-, mast-, and multinuclear-cells and polymorphonuclear leukocytes are sparingly found. Giant-cells are rarely described. The dense cellular mass may at times be so closely associated with the epidermis as to interfere with the continuity of the basal layer. The epidermis shows edema, and marked hypertrophy of the rete (acanthosis), of the granular layer, and of the stratum corneum (hyperkeratosis). Colloid degeneration occurs in certain of the epithelial cells. A plausible explanation of the process of umbilication is made by Crocker and Fordyce, to the effect that the thickened, horny layer sinks into the rete in a funnel-shaped manner, and when eliminated leaves the depression or umbilication.

In the hypertrophic form the above described process is exaggerated, the epidermal changes being more marked, and the cellular infiltration extending more deeply into the corium, where, in addition, increase in the collagenous tissue and newly-formed vessels are found.

The histology of the lesions of the atrophic form, as studied by the author,¹ agrees with the original of Darier and others since, and consists in the main of a sclerosis of the papillary and subpapillary layers of the corium, and a deeply situated cellular infiltration, with, in addition, the horny plugs extending into the sweat-ducts. In the annular variety Engman describes the usual lichen planus picture in the active periphery of the ring, occurring, however, in a mild degree. Nearer the centre regressive changes are noted, while in the centre a regenerative process is in progress.

The histology of the mucous-membrane lesions corresponds closely to that of the cutaneous lesions.

Joseph², Whitfield, and others have reported the formation of small vesicle-like cavities in the basal layer. Joseph explains the umbilication of the papule by absorption of these pseudo-vesicles.

Diagnosis.—The diagnosis rests upon the characteristic features heretofore described. Thus, in its size, apex, color, and course the papule of papular eczema is quite different from that described above, being brighter, redder, more acuminate at the apex, and much more often followed or accompanied by catarrhal symptoms in the skin. In

¹ Loc. cit.

² Loc. cit.

psoriasis punctata the scales are abundant and readily removed; and the individual lesions are increased rapidly by peripheral extension, far beyond the fullest development of the papule of lichen planus. The papular syphiloderm is not, as a rule, pruritic, not flattened when minute, not polygonal in shape, and not covered with a closely adherent, horny scale; and it always occurs in patients in whom careful investigation discloses other symptoms of the disease (mucous patches, adenopathy, etc.). The history and course of the disease will determine the diagnosis.

Chronic lesions of lichen planus on the legs (obtuse, verrucous, hypertrophic) have been confused with the condition of the same parts developed in Kaposi's *multiple idiopathic pigmented sarcoma*. In the disorder last named, the elephantiasic aspect of the limb, the infiltration of the integument, especially at the root of the toes, and the characteristic roundish nodules springing from the general surface, suffice to render the diagnosis facile.

The distinctions noted above in connection with lichenification of patches of chronic inflammation of the skin are not to be disregarded.

Treatment.—Systemic treatment depends upon the condition of the patient. As many of the subjects of lichen planus are neurotic, neurasthenic, or suffering from other depressing or debilitating conditions, it follows that in many instances it is necessary carefully to regulate the diet, habits of rest, sleep, and exercise, and to administer tonics, cod-liver oil, and other remedies which will build up the general health. In some instances a change of climate, scene, and occupation is of the greatest value.

Arsenic, though sometimes causing an aggravation of the symptoms in acute cases, is a valuable remedy in many subacute or chronic and extensive cases of the disease. It may be given as directed for the treatment of psoriasis. Mercury, in the form of biniodid, bichlorid, or the protiodid, is increasingly recognized as of unquestioned value in many cases. The protiodid, grain $\frac{1}{8}$ (0.01), with or without arsenous acid, grain $\frac{1}{20}$ (0.0033), may be given three times a day. Excellent results have been obtained by us with the hypodermatic use of the bichlorid of mercury. Deep injections into the muscle are given in the same manner as in syphilis. The dosage varies from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain (0.008 to 0.016) every second day. Usually a dozen injections are sufficient to relieve an ordinary case. Crocker recommends the use of salicin in 15-grain (1.0) doses three times a day, and large doses of quinin in an effervescent mixture. Tilbury Fox and Robinson found the alkaline diuretics, taken well diluted after meals, of value, especially in the generalized hyperemic cases. For very acute cases, we have found the remedy of value at times in relieving excessive itching. Aspirin in 5-grain (0.33) doses may be used for the same purpose. Hartzell¹ advocates the employment of

¹ Jour. Amer. Med. Assoc., July 20, 1907, p. 225.

the salicylates. Pernet¹ reported a case of acute lichen planus rapidly cured by removal of $7\frac{1}{2}$ c.c. of spinal fluid by a spinal puncture. He further reports Ravaut and Thibierge,² of Paris, as having worked along the same lines in treatment.

Local treatment should be directed toward the protection of the skin and the relief of itching. For many cases the use of a paste and dusting-powder, as described in the treatment of eczema and psoriasis, gives satisfactory results. A paste containing equal parts of lanolin, vaselin, zinc-oxid, and talcum, with from 1 to 3 per cent. of salicylic acid, is usually effective. In very acute and extensive cases, more relief sometimes is obtained by the use of the soothing lotions and dusting-powders recommended for the treatment of the acute stages of eczema. The same care should be taken as in eczema to have the clothing next the skin of soft cotton or linen. In many instances bathing once a day in tepid oatmeal- or bran-water, with or without the addition of an alkali, may precede the application of the paste or other remedy. Some patients, especially those with much scaling and infiltration of the skin, are made more comfortable with the use of ointments than with pastes. In subacute and chronic cases tar, in the form of lotion, ointment, or paste, is often of value. Directions for its use are given in the section on Eczema. For stubborn patches the treatment differs little from that recommended for inveterate psoriasis. For hypertrophic areas, salicylic acid is most effective. It may be applied in a paste or ointment containing from 30 to 60 grains (2-4.) to the ounce (30.); or, better, it may be dissolved in equal parts of alcohol and ether, and the solution painted on the patch. The alcohol and ether evaporate and leave the acid in contact with the lesion. After a sufficient amount has been applied, the whole may be covered with adhesive plaster. The dressing should be changed every day or two, and when the part becomes greatly inflamed a soothing dressing should be substituted. Brocq and Jacquet recommend the daily use of a tepid douche for from two to ten minutes at a time, alternated with the application for a few seconds of a cold spray.

For chronic cases with much infiltration, the x -rays are indicated. We have used the method, in conjunction with other treatment, in a large number of cases with decided improvement, including relief of itching in all, and unusually rapid recovery. The number of exposures in each case varied from two to nine, and the technique was that commonly employed for psoriasis.

Prognosis.—The prognosis is in general favorable, since even cases of long standing are relieved when the subjects of the disease are placed under conditions favorable for recovery. When the patient is neurasthenic, the eruptive symptoms may persist for years, accompanied by intense itching and a consequent teasing of the nervous centres. In this class of subjects it is generally well to make a guarded prognosis, and to pronounce upon the future with reserve.

¹ Brit. Jour. Derm., 1913, xxv, p. 261.

² Annals, 1913, p. 461.

LICHENIFICATION.¹

Synonyms.—Lichen Simplex Chronica (Vidal). Fr., Névrodermite.

Definition.—This term was applied by Brocq to denote a condition in the skin where the normal lines are increased and the skin becomes thickened, producing patches resembling lichen planus.

Symptoms.—The disorder may be local, or more or less diffuse. Early there is intermittent itching in the area, which induces rubbing and scratching, this being followed by various changes in the skin. It becomes darker in color and thickened, the normal lines being increased, producing flat, irregular papules, some of which have a faceted appearance. The surface of a fully formed patch is divided into more or less elevated, triangular, square, or irregular areas, presenting a mosaic-like appearance. Moderate scaling occurs. The patches vary in shape, being oval, irregular, or angular in outline. They occur most frequently over the nape of the neck, the upper and internal surfaces of the thighs, the loins, the anterior and external part of the leg, the scrotum, the vulva, the popliteal and axillary folds, and on the palms and soles. They may be single or multiple, and they present a tendency to symmetrical distribution. The itching is intense, the paroxysms being worse at night.

In the generalized cases the skin becomes discolored and pigmented, and interspersed here and there are patches similar to those described above, with papules irregularly distributed over the surface. A group of cases described by Fox,² Fordyce,³ and Haase,⁴ presenting a lichenoid eruption in the axillary and pubic regions, closely resembles the group of cases above described. In these cases the eruption is described as being composed of numerous small, firm, smooth, and rounded papules, which are aggregated, and form deeply infiltrated patches, slightly reddened or of the normal hue of the skin. Intense itching leads to scratching, which produces secondary changes.

The disorder occurs in neurotic individuals, and in those who have undergone nervous strain. Many of the etiological factors mentioned in connection with lichen planus apply to this disorder. The disease is persistent, and when relieved tends to recur, the axillary cases having been particularly resistant to treatment. A variety of lichenification may follow certain inflammatory conditions of the skin, such as eczema.

Histopathology.—The principal changes consist in hyperkeratosis, acanthosis, cellular infiltration, and edema in the papillary layer of the corium, without much change in the blood-vessels. In the axillary cases described by Fordyce and Haase, similar changes were

¹ For full discussion of the subject, see Brocq's chapter on "Les Lichens," *La Pratique Derm.*, Tome iii, p. 119.

² *Jour. Cut. Dis.*, 1902, xx, p. 1: Two cases of a rare papular disease affecting the axillary regions (histopathologic report by Fordyce).

³ *Trans. Amer. Derm. Assoc.*, 1908, p. 118: A chronic, itching, papular eruption of the axillæ and pubes: its relation to neurodermatitis.

⁴ *Jour. Amer. Med. Assoc.*, January 21, 1911: A chronic, itching, papular eruption of the axillæ, pubes, and breast.

noted, with the additional involvement of the sweat-coils. These were dilated; some of the tubules contained partial or complete casts, and their cells had undergone parenchymatous degeneration. An infiltration of lymphocytes and plasma-cells occurred about the blood-vessels and in the region of the coils. In other places the collagenous tissue had undergone mucoid degeneration.

Diagnosis.—The disorder is to be differentiated from lichen planus and papular eczema. In the former condition the patches have a better definition; their color is more marked, being of a violaceous or reddish tint; the flat-topped, shining papules are more definite; white striæ over the papules are likely to be present; and the sites of predilection, over the flexors of the wrists and about the ankles, are different.

Treatment.—The treatment is similar to that employed in chronic eczema, and consists in stimulating applications containing tar, salicylic acid or resorcin. For localized patches, we have found radiotherapy the most successful method of treatment. The general management is that indicated by the individual case.

LICHEN NITIDUS.

This disorder was first described in 1907 by Pinkus.¹ A clinical and histological study of the disease has since been made by Kyrle and McDonagh,² Arndt,³ Sutton,⁴ and Reines.⁵

Symptoms.—The disorder resembles lichen planus to a moderate degree. The lesions are small, glistening papules or nodules, sharply defined, roughly circular or polygonal in outline, slightly raised above the level of the surrounding skin, and pinkish in color or of the same hue as the surrounding skin. They occur in groups, without coalescence of the individual papules. In the centre of a papule or nodule a fine aperture has been described. No particular arrangement of the lesions occurs. The favorite sites have been the genital region, the abdomen, breast, flexors of the elbows, and palms of the hands. As a rule, the lesions remain localized, but a more general distribution has been noted. Subjective sensations are absent, and it is suggested that the disease has so long remained undescribed for this reason. The disorder is chronic.

Etiology.—The disorder has occurred, in most cases, in men, only one case having been reported in a woman. Tuberculosis is suggested as the etiological factor, from the histological architecture. However, animal experiments have thus far been negative. In the case described by Kyrle and McDonagh, a positive reaction was obtained after the injection of tuberculin.

¹ Ueber eine neue knötchenförmige Hauteruption: Lichen nitidus. *Archiv*, lxxv, p. 11.

² *Brit. Jour. Derm.*, 1909, xxi, p. 339.

³ *Zeitschrift*, xvi, p. 551; abstr. *Brit. Jour. Derm.*, 1910, xxii, p. 30.

⁴ *Jour. Cut. Dis.*, 1910, xxviii, p. 597.

⁵ *Med. Klin.*, 1910, xxx; abstr. *Brit. Jour. Derm.*, 1911, xviii, p. 299.

Pathology.—The pathogenesis of the disease is unknown. The histopathology appears to be characteristic, the disease belonging to the granulomata. The cellular infiltration is situated chiefly in the papillary and subpapillary layers of the corium. The infiltration is dense and well defined, and consists of giant-cells, epithelioid, and mononuclear round cells. The collagen in the affected area shows degenerative changes, and in certain cases has practically entirely disappeared in the infiltrated areas. The epithelial changes are secondary. Directly over the nodule, the epidermis is thinned, but on either side prolongation of the epithelial pegs is noted. No tubercle bacilli or caseous degeneration has been found, and animal experiments have been negative.

Diagnosis.—The disease is to be distinguished chiefly from flat warts and lichen planus. From the former it may be distinguished by the small size of the lesions, their greater number, and their distribution; from the latter by the absence of itching, absence of color, the distribution of the lesions, and their arrangement.

Treatment.—Sutton reports the disappearance of lesions in his case with the use of a salicylic-acid and resorcin ointment, used alternately with a benzoinated zinc-oxid ointment.

IMPETIGO.

Synonyms.—Ger., Eiterflechte. Fr., Impétigo, Dartre humide.

The various forms of impetigo described by older writers are now otherwise classified, leaving impetigo contagiosa, impetigo of Bockhart, and impetigo herpetiformis as the only diseases designated by this title. There is little connection between these three, except that they are pustular dermatoses. The impetigo of Bockhart is a superficial pustular folliculitis, and impetigo herpetiformis is a rare and grave disorder.

Impetigo Contagiosa (Tilbury Fox).—Impetigo contagiosa is a contagious disease of the skin, characterized by vesicles, pustules, and superficial crusts, usually occurring on exposed portions (the face and hands), devoid of subjective sensations, and terminating without sequels.

Symptoms.—The early lesion is a flat and erythematous spot or a vesicle, the latter rapidly changing into a pustule, which subsequently dries, forming a superficial crust. In most cases the lesions are located on the face, ears, neck, and hands, but any part of the cutaneous surface may be attacked, including the mucous membrane.

The crusts are gummy-like, yellowish, or occasionally darker colored when admixed with blood. They are very superficial and appear to be stuck on the skin. They extend somewhat beyond the borders of the original lesion, and their edges are sometimes slightly curled upward. Underneath the crusts there is a superficial erosion, having a distinct outline. When the crust is removed, there is presented simply a reddened, weeping surface. The lesions vary from pinhead- to

dime-sized or larger; rarely there is a sprinkling of red papules associated. In a given case all the lesions above described are usually present. In children, pustular lesions of the fingers are not uncommonly associated with impetigo of the face. Stomatitis is observed from time to time. Montgomery¹ reports a group of cases of involvement of the lips, mouth, throat, nostrils, eyelids, and conjunctiva.

FIG. 79



Impetigo contagiosa, superficial type.

Impetigo Contagiosa Gyrata.—This is a clinical variety of the disease in which the lesions spread peripherally, clearing in the centre, forming circles, and by coalescence with other lesions produce a gyrate appearance. Schamberg² reported a remarkable instance of this type. Crocker,³ in 1895, described this variety as having been seen in England only during the past two years. While this form is uncommon, it is met with sufficiently often to be easily recognized.

¹ Jour. Cut. Dis., 1910, xxviii, p. 445.

² Ibid., 1896, xiv, p. 169.

³ Brit. Med. Jour., November 2, 1895.

FIG. 80



Impetigo contagiosa.

FIG. 81



Circinate impetigo. (MacKee.)

Impetigo Contagiosa Bullosa.—This is a descriptive term for that variety of the disease in which bullous formation predominates. It is uncommon in adults except in warm countries. Sir Patrick Manson¹ has described this form under the title: "Pemphigus Contagiosus Occurring in Children as well as Adults." Corlett² reported a very interesting epidemic of this type occurring in soldiers recently returned from Florida, after the close of the Spanish-American war. In several carefully observed cases Corlett described the evolution of the lesions in the main as follows:

The lesions begin with one or more small, reddish spots, from pin-head to split-pea in size. After about twelve hours, the epidermis becomes slightly raised with a clear, serous fluid. The vesicle thus formed extends peripherally, commonly attaining a size varying from 1 to 5 c.c. in diameter. The epidermic covering of the bulla is thin, and rubbing of the clothing is sufficient to cause its rupture, leaving a shrivelled tent, containing a serous fluid in its folds. About the third day the contents of unruptured vesicles become opaline or tinged with streaks of yellow, the latter process beginning below and extending upward. The entire contents rarely become purulent. The bleb rises from the sound skin, in most instances, without an areola or other sign of inflammation. At first fully distended, after maturity it becomes flaccid; at other times the blebs are round, oval, or horseshoe-shaped. In all instances there is marked tendency to extend peripherally, and after rupture the distal margin is the only part distended with fluid. At times the centre heals, while the serous undermining of the epidermis continues at the periphery, giving rise to the regular ring or gyrate lesions. When the epidermis is removed, there appears a moist area, at first reddish and glazed, which later becomes covered with a light coating of friable crusts or tissue-paper-like scales. After healing, slight pigmentation remains for a month or so.

The location of lesions of this type is the face, the hands, the axillæ, and, finally, a generalized distribution.

In older children and adults, a bullous impetigo may follow vaccination,³ or may occur independently, this form having been seen by the author, particularly in public practice, the bullæ very closely simulating those seen ordinarily in pemphigus. Engman⁴ states that bullous impetigo is not uncommon in St. Louis, particularly in the summer. In infants the disease occurs sporadically and epidemically. It is comparatively common,⁵ and is known as *Pemphigus Neonatorum*. It frequently occurs in epidemics in obstetric wards of public institutions, and in foundling homes, and many cases have been traced to the practice of certain midwives.

¹ Manson on Tropical Diseases, 1898.

² Cleveland Jour. of Med., 1898, iii, p. 513.

³ Elliot, Jour. Cut. Dis., 1894, xii, p. 194.

⁴ Ibid., 1901, xix, p. 180 (with extensive bacteriological bibliography).

⁵ Foerster, Jour. Amer. Med. Assoc., 1909, liii, p. 358 (with discussion of the relationship between impetigo contagiosa and pemphigus neonatorum, and literature); Biddle, Jour. Cut. Dis., 1914, xxxii, p. 268 (a report of two epidemics of so-called pemphigus neonatorum).

The lesions develop at variable periods after birth, beginning on any part of the body and spreading to other portions. They consist of vesicles and bullæ, usually situated on an erythematous base and occurring in various sizes, with serous or purulent contents. The lesions often burst before reaching maturity, the area meantime spreading over a space with a diameter of several centimeters. After bursting, the areas of involvement spread, with centrifugal denudation of the epidermis. The fluid furnished by the lesions is scanty or abundant, of a yellow or (especially in cases that have proved fatal) grayish tinge. In mild cases the lesions are few and constitutional symptoms absent. In others there is a rapid development of the lesions over large surfaces, with an early fatal termination. Rarely there are constitutional symptoms, including inappetence, elevation of temperature, diarrhea, and exhaustion.

The several clinical pictures of impetigo differ on account of the greater or lesser diffusion of the contagious elements in each case; also, the vulnerability of the skin, largely expressed by the age of the patient, and also by climatic conditions, the serious extensive and bullous form occurring in warm or hot climates. In the ordinary case there may only be a few isolated, pea-sized or larger vesico-pustules on one hand; or many may be scattered about the mouth and lips; or dense, greenish crusts may succeed such lesions over the occiput or scalp; or there may be much larger pustulo-bullous lesions over the legs, which are torn, scratched, and thickly covered with pustular or hemorrhagic incrustations.

Etiology.—The disease is a pus infection, the result of the transmission to the skin, through the medium of the finger-nail, filthy or otherwise, of an infection of streptococci, staphylococci, or both. In children the disease is often associated with pyogenic nasal infection. It may be conveyed from one child to another, and hence is frequently contracted in schools. Women contract the disease from children, while in men the most frequent source of infection is the barber-shop. The eruption often occurs during convalescence from a more or less actively contagious disease. The antecedence of some fever in many cases is admitted by all observers. Duhring and Fox have seen it follow vaccinia. It may occur typically in a series of children, each of whom is convalescent from varicella.

Montgomery and Morrow¹ reported a large increase in impetigo following the great San Francisco fire, and suggested that the spread was due to flies, opportunity for infection being presented by the disorganized state of society at that time. In the infantile and epidemic cases infection is simply transmitted either directly or by mediate objects. Even with strict precautions the disease will spread in an obstetrical ward when once started, and the epidemics following in the wake of midwives indicate the factor there.

A large number of observers have examined the lesions bacteriologic-

¹ Jour. Cut. Dis., 1909, xxvii, p. 435.

ally, and in the major number of cases staphylococci have been found. Griffon and Balzer,¹ Sabouraud,² Leroux,³ Gilchrist,⁴ and many others have found streptococci in unruptured vesicles. Engman⁵ obtained the *Staphylococcus pyogenes aureus* in pure culture in 7 out of 8 cases; and in the infant variety Foerster⁶ also obtained chiefly the *Staphylococcus pyogenes aureus*. Clegg and Wherry⁷ isolated a diplococcus in 5 cases studied in the Civil Hospital at Manila. This organism was identical with the *Micrococcus pemphigi neonatorum*.⁸ Dohi and Dohi⁹ describe two forms found in Japan—one produced by a white staphylococcus, the other by a streptococcus. Both forms may be infected secondarily by a yellow staphylococcus.

From a survey of all the findings, it is apparent that both staphylococci and streptococci are concerned etiologically in the production of the disease.

Pathology.—The cause of the disease being an infectious one, a pathological study has been made (largely of the vesicles, bullæ and crusts) to determine chiefly whether a particular organism could be implicated. The histology of an early lesion is well described by Gilchrist.¹⁰ The contents of the vesicle consisted of a large number of polynuclear leukocytes, a considerable number of round mononuclear cells, a few detached epithelial cells, a small quantity of fibrin, and a large quantity of coagulated albumin (serum). There was a collection of polynuclear cells in the vesicle; and in the collection were found, on special staining, a large number of cocci, which, on culture from other vesicles, proved to be the *Staphylococcus pyogenes aureus*.

The vesicle was situated between the horny and mucous layers. The stratum mucosum was swollen, and numerous polynuclear leukocytes were found traversing this layer. The corium, chiefly in the upper part, showed an acute inflammatory condition, indicated by dilated vessels, serous infiltration, increase in the number of round and mononuclear cells, and numbers of migrated polynuclear leukocytes. In cultures taken at this time Gilchrist only succeeded in obtaining the *Staphylococcus aureus* and *albus*. In his later work, as above mentioned, he was able to obtain a streptococcus.

Unna¹¹ states that the cocci are never found in leukocytes, and that they are always extracellular. Engman,¹² on the contrary, found both large masses and small numbers of cocci within the bodies of leukocytes; from which fact the latter draws the conclusion that the virulence of the organism is mild.

Dewèvre¹³ reports a number of successful inoculations and autoinoculations practised with the contents of the vesico-pustule, with finely

¹ La Presse méd., 1897, lix, p. 130.

² La Pratique Derm., 1901, ii, p. 878.

³ Trans. Amer. Derm. Assoc., 1899, p. 87.

⁴ Loc. cit.

⁵ Almquist, Ztschr. f. Hyg., 1891, p. 253.

⁶ Archiv, 1912, cxi, p. 629; abstr. Jour. Cut. Dis., 1913, xxxi, p. 123.

⁷ Duhring's Cutaneous Medicine, vol. ii, p. 431.

⁸ Histopathology, p. 189.

⁹ Arch. de Méd. et de Pharm. mil., 1885, vi, p. 210.

¹⁰ Annales, 1893, iv, p. 290.

¹¹ Loc. cit.

¹² Jour. Infect. Dis., 1906, p. 165.

¹³ Loc. cit.

powdered impetiginous crusts, and with the products of scraping the subjacent erosion. In 1884, Dr. Hyde reproduced an almost typical vesico-pustule upon the left forearm by inoculation with the moistened débris of crusts. This inoculation was done in the clinic, the crusts being taken from typical lesions upon the face of a young girl inoculated, while under observation, from the lesions of exactly similar character on the face of her twin sister. The lesion on the forearm produced a characteristic crust, which in seven days was also used for the inoculation of two students then present at the clinic, in one of whom there was no result and in the other an abortive lesion.

Diagnosis.—To establish the identity of this affection, it is necessary to define the exact differences between it and eczema pustulosum. These differences are: first, the absence of infiltration of the tissues affected; second, the absence of itching; third, the failure of the lesions to form patches; fourth, the isolation and wide separation of lesions distinctly pustular; fifth, the large development and rather persistent character of the pustules; sixth, the evident termination of the disease, which does not, as in many cases of eczema, progress to form a freely discharging and crusting surface, the pustular being but the initial stage of a distinct morbid process. Manifestly, however, an impetigo of the sort described is not incompatible with an eczema which is often originated by less irritating causes.

In ecthyma the pustules are in appearance much more formidable than those of impetigo, in consequence of their size, depth, inflammatory base, areola, flat, hard and bulky crust, and erosive action upon the skin.

In varicella the lesions are small, much more widely distributed over the body, and are vesicular only, rarely bullous. In pemphigus and herpes iris the seat, character, and period of evolution of the lesions suffice to establish the diagnosis.

From hyphogenous sycosis it is so readily distinguished that the differential points need not be described. The latter is mentioned only for the reason that it represents the disease popularly called "barber's itch;" while today large numbers of barber-shop cases of contagious impetigo are erroneously being called, both by physicians and laymen, "barber's itch."

Treatment.—Pustules, when present, are to be opened with an aseptic needle, the purulent contents gently removed by irrigation with a mild antiseptic solution, such as boric acid, and the lesion dressed with a mild antiseptic ointment, such as a 1 to 4 per cent. ointment of ammoniated mercury. In the ordinary cases in children, this procedure will readily clear up the trouble. In adults, in the common types about the face and hands, the procedure may be as follows: Bathe the areas thoroughly in the evening with a 1 to 2000 bichlorid solution. After the bath apply an ammoniated mercury ointment in the strength of 3 to 5 per cent. In the morning repeat the bichlorid bath, after which apply a dusting-powder composed of the mild chlorid of mercury 1 drachm (4.), boric acid 1 drachm (4.), and talcum powder 6 drachms (24.).

In the epidemic infant variety, Foerster obtained good results by opening the vesicles and bullæ and applying a 2 per cent. ammoniated mercury ointment. The individual lesions were dressed to prevent their spread. In addition, a general bath was given in a warm permanganate of potassium solution. This appeared to be of value also in preventing autoinoculation. In extensive cases external heat, with strychnin and brandy, was also recommended as a supporting measure.

Ecthyma (Ger., *Ekthyma*, *Eiterblase*).—Ecthyma is a pustular infection of the skin of the same nature as impetigo, but of deeper situation. It is inoculable and autoinoculable, and characterized chiefly by the formation of large, flat, variously colored crusts.

Symptoms.—The disease occurs most frequently on the lower extremities, chiefly below the knees; in children about the buttocks. The inflammatory process is comparatively deep-seated.

The primary lesion is a vesicle or a vesico-pustule, situated on an inflamed base, the inflammatory process soon extending deeply. The lesion spreads peripherally, and in the course of several more days crust-formation occurs. As the crust dries, it becomes dark-brownish in color and firmly attached at the margins. Beneath the crust a superficial ulcerative process proceeds, the margin of this area being elevated, producing a crater-like appearance when the crust is removed. The elevation of the margin causes the shallow ulcer to appear deep. In the course of from two to four weeks, healing occurs beneath the crust, the latter being exfoliated, leaving usually a slight scar, with more or less pigmentation.

In certain debilitated states, a gangrenous ulcer appears in place of the one described, which is more deeply situated, causes greater destruction of tissue, and is followed by more intense sequels.

The subjective phenomena are sensations of heat, burning, pain, and soreness. In certain cases there may be accompanying lymphangitis or adenopathy. In public practice a mixture of symptoms may be present, due to trauma and to autoinfection from scratching.

Etiology.—Among predisposing factors should be mentioned a loss of resistance through ill health. The infection, therefore, occasionally follows anemia, asthenia, and the convalescence from many diseases. It is a disease usually seen in the cachectic and poorly nourished of the public-patient class and rarely in private practice. Improper and insufficient food, bad hygiene, over-work, and uncleanness are all predisposing factors. The exciting cause is the same as that of impetigo, and investigators disagree as to whether it is the streptococcus or the staphylococcus. A larger number of microorganisms have been isolated here than in impetigo. The identity of cause between these two disorders is frequently seen by their presence in an individual at the same time, typical lesions of impetigo being present on the face, with those of ecthyma on the limbs below the knees. In Corlett's¹ cases occurring in soldiers this fact was well illustrated.

¹ Loc. cit.

Balzer and Griffon,¹ in a study of a number of cases of ecthyma, found in all cases streptococci in the form of diplococci-like fine grains. When cultivated, this organism presented the features of *Streptococcus pyogenes*, and experimentally it was pathogenic.

Pathology.—The pustule of the disease differs from the pustule of eczema or the pustule of impetigo in the severer exudative process by which it is produced, and in its limitation to the exact site of external irritation. Early there is found in the corium the usual evidences of inflammation—dilated blood-vessels, with perivascular cell-infiltration, and migration of leukocytes up into the epidermis. In severe cases, necrosis occurs, destroying the papillary layer, the result being a cicatrix, which contracts as it grows older, and which in mild cases is finally barely visible as a minute, cicatriform punctum. According to Unna, the ecthyma pustule, as distinguished from that of impetigo, is less an epidermal abscess than the result of epidermal inflammation, fibrinous at the centre and exceedingly edematous at the periphery. The crust contains fibrin and epidermal layers.

Sabouraud points out that the original streptococcic infection is often succeeded by a secondary microbial involvement, whereby the staphylococci present are enabled to produce the peripheral lesions of impetigo and furunculosis.

Diagnosis.—Ecthyma is liable to be confounded with the other pustule-producing exudative affections, but as the distinction between them is largely artificial and based upon the severity of the inflammatory process, there is small danger in consequence. Kaposi expresses the truth in his suggestion that there can be but little objection to the employment of the term "ecthyma" when it is desired to characterize precisely the pustular grade of any cutaneous inflammation at a given time. The pustules of variola are "ecthymaform," and many of those seen in syphilis exhibit similar characters; but the history of the general affection should throw light upon the identity of the cutaneous disease. In syphilis, moreover, the ulceration at the base of the lesion exhibits the pronounced features of the syphilitic ulcer in its secretion, floor, edges, base, crust, and career. The crust, in particular, of the flat, pustular syphiloderm has the rupioid, conical appearance which suggests the shell of the oyster, and the underlying ulcer is larger and deeper than in ecthyma. In the furuncle there is usually a central core. In impetigo the pustules are not deep-seated, and there is no ulceration at the base; the crust is superficial, yellowish, firmly adherent, and the lesions are more numerous.

Treatment.—The general treatment of patients affected with ecthyma is a matter of importance. A proper regulation of the food and hygienic surroundings is not to be neglected. Tonics are frequently indispensable, including iron, quinin, and strychnin. The destruction of any pediculi and the cleansing of the skin with soap and water will often be sufficient to effect a great change. This fact is well illus-

¹ Loc. cit.

trated in hospital practice, where young patients rapidly improve after a bath, followed by inunction with vaselin, and a few substantial meals of a nutritious character. When the lesions are abundant, the treatment is in general that of pustular eczema. Crusts are to be removed after soaking with oil or fat; and the floors of the former pustules, after washing with carbolated water, should be dressed with an ointment containing from 10 to 15 grains (0.66–1.) of ammoniated mercury to the ounce (30.) of lard. If the minute basal ulcers are sluggish, they may, after careful cleansing, be touched with a small swab that has been dipped in a 5 per cent. formalin solution or in a solution of mercuric chlorid in tincture of benzoin, 1 grain (0.066) to the ounce (30.). Phenol or boric acid or iodoform may be employed for the same purpose. For the salve mentioned above may be substituted one containing 10 grains (0.66) of calomel, or $\frac{1}{2}$ drachm (2.) of bismuth subnitrate to the ounce (30.) of salve-base.

Veldt Sore (Natal Sore) (*Barkoo; Barcoo Rot of Queensland*).—Under this title has been described a disorder which Crocker¹ reported as somewhat common among the medical officers and soldiers of the English army during the late war in South Africa. It most often attacked cavalrymen. As distinguished from the Natal sore, which was chiefly found in the lower part of that country, the veldt sore was most abundant in the high, barren table-lands. Multiple lesions appeared on the hands, forearms (chiefly on the backs), feet, and legs, but were rare on the face and other portions of the body. A pinhead-sized, itching papule, vesicle, or pustule first appeared, subsequently enlarging and filling with a yellowish serum, which later became turbid, ruptured, and left a small- to large-coin-sized, painful, crusted ulcer, exuding sero-pus, and often accompanied by inflammation of the lymphatics and glands. In some cases the back of the hand was entirely covered.

The disease is produced by pyogenic microorganisms. Castellani and Chalmers² found streptococci in the lesions. The *Staphylococcus aureus* has been isolated (Harland). Crocker was inclined to believe that the disorder is a semitropical variant of impetigo contagiosa.

Treatment.—The usual treatment of such infected lesions (boric-acid fomentations and ointments) was speedily effectual.

DERMATITIS VEGETANS.

Under the title of *Pyodermite végétante*, Hallopeau³ describes five cases of a disease affecting chiefly the scalp, axillæ, genitals, groins, lips, and the mucous membrane of the mouth, in which there appear miliary pustules, which soon are surrounded by a hyperemic base. The pustules appear in successive groups, coalesce, and the area thus formed becomes covered with crusts, beneath which form more or less

¹ Dis. of the Skin, 3d ed., 1903, p. 1075.

² Manual of Tropical Med., p. 1168.

³ Archiv, 1898, xliii, p. 289; and xlv, p. 323.

elevated vegetating surfaces. These patches may increase by peripheral extension, but more commonly by the formation of new pustules at the border. On the mucous membranes, rupture of the pustules is followed frequently by superficial ulcers. The disease yields readily to antiseptic treatment, leaving only a pigmentation, which gradually disappears. Hallopeau considered the disorder a type of local infection spreading by autoinoculation. Similar cases have been reported under the title of *Dermatitis vegetans* by Hartzell,¹ Jamieson,² Crocker,³ King-Smith,⁴ Pernet,⁵ Pusey,⁶ Fordyce and Gottheil,⁷ and others. Wende and DeGroat⁸ report 6 cases in infants, with 4 collated from the literature. Six of the 10 developed during the course of eczema, 4 independently of any other dermatosis. In these the lesions began as papulo-pustules, followed by crusts and vegetations. The face and scalp were chiefly involved, but in some the wrists, arms, and legs were involved. In all there was the same type of papulo-pustules appearing in groups; the resolution of old lesions with the appearance of new; the production of vegetations; and the disappearance of the disease under antiseptic treatment. The disorder is probably the result of an infection, and not directly related to the eczema which preceded the disease in some of the cases.

The disease is distinguished easily from pemphigus vegetans, which it resembles clinically, by the readiness with which it yields to antiseptic treatment, and by its failure to affect the general health of the patient.

FURUNCULUS.

Synonyms.—Furuncle, Boil. Fr., Furoncle, Clou; Ger., Furunkel, Blutgeschwür, Eiterbeule, Eitergeschwür.

Definition.—A furuncle is a staphylococcic infection of a hair-follicle, producing a painful cellulitis, which terminates in the death of tissue and the expulsion of a necrotic plug. Furunculosis is the succession of furuncles.

Symptoms.—Furuncles commonly begin as tender and painful indurations in the skin or its subjacent tissues, the summit of each nodule soon becoming visible in the epidermis as a reddish punctum. A furuncle is the result of an active inflammatory process, limited to a definite area, and of greatest intensity at the centre of the involved mass. This centre is often represented by a hair-follicle, the pustule that forms subsequently being perforated by a hair.

More or less rapidly thereafter these symptoms are succeeded by increased redness, heat, and tumefaction, the latter producing a nut- or egg-sized tuberosity, well projected from the surface or fairly imbedded within or beneath the derma. A yellowish point in the centre

¹ Jour. Cut. Dis., 1901, xix, p. 465 (with histology).

² Brit. Jour. Derm., 1902, xiv, p. 407.

³ Jour. Cut. Dis., 1910, xxviii, p. 605.

⁴ Ibid., 1906, xxiv, p. 555.

⁵ Ibid., 1911, xxix, p. 473.

⁶ Ibid., 1909, xxi, p. 87.

⁷ Ibid., 1912, xxx, p. 517.

⁸ Ibid., 1906, xxiv, p. 543.

of the erythematous swelling soon announces the occurrence of supuration. When accidentally or artificially opened at this summit, exit is given to thick, yellowish pus, with which blood may be commingled from the traumatism of neighboring capillaries. The small abscess may then, after discharging its purulent contents for a few days, gradually close by granulation; or may also expel from its cavity a tenacious, pus-covered, yellowish-green slough, known as the "core." This evacuation is usually followed by relief of the tense and throbbing pain which is the well-known subjective characteristic of the furuncle.

The length of time requisite for the completion of this process varies, with the extent of tissue involved, from a few days to several weeks. Boils may occur in any part of the body, but are most common about the face, the auricular region, the neck, the armpits, the anogenital surfaces, the hips, the buttocks, the breast, and the extremities. They may occur as single or as multiple lesions, or they may succeed each other in crops, especially about the buttocks, trunk, and thighs, for a period of several months. The disease of the skin may produce a constitutional effect, manifested in pyrexia, which is usually encountered only in individuals of irritable constitution, when the furuncles are few and short-lived. There is also a decided chloroanemia, due to pain, fever, purulent drain, irritability of nervous centres, inappetence, and consequent perversion of nutrition.

The sequels of boils are maculations of a violaceous tint, often perceptible in the skin for weeks and even months after disappearance of the lesions; and pinhead- to penny-sized cicatrices, which are permanent.

Etiology.—The exciting cause of furunculus is local infection with one of the pyogenic microorganisms, usually, if not always, the *Staphylococcus pyogenes aureus*,¹ though other pus-producing cocci also are found in the lesions. The remote cause is often exceedingly obscure. It is true that boils are encountered in typical subjects of diabetes, of the exanthemata, and of "hospitalism," in whom anemia, asthenia, marasmus, malnutrition, and exhaustion resulting from excesses, from grave general disease, from low fevers, and from nervous strain, play a prominent part. But the reverse is also true.

Scratching, eczema, scabies, other cutaneous diseases, lice, and external irritants of various sorts are responsible for many boils, especially those that are few and not followed by similar lesions. When, however, such sequence occurs, it should not be forgotten that the pus is autoinoculable, and that furuncles, if sufficiently numerous and large, are capable of disturbing the general economy. A collar-button at the back of the neck; the edges of an unyielding corset in one unaccustomed to it; a hard bench; a saddle-tree; a velvet coat-collar sheltering the germs responsible for a previous attack; and many similar articles may be the exciting cause of furuncles.

Account should always be had, in cases of persistent furunculosis,

¹ Gilchrist, Johns Hopkins Hosp. Reports, 1903, xiv.

of externally operating poisons. In this category must be included arsenical wall-papers, and the poisons handled in the trades, *e. g.*, by dyers, lead-manufacturers, and others.

Lastly, it is exceedingly common for patients thus affected to apply to practitioners for remedies intended to "purify the blood;" and, inasmuch as potassium iodid is often prescribed in response to this demand, the original trouble is thus enhanced to a manifold extent. Many cases of furunculosis are instances of boils, resulting originally from external irritation, that have greatly multiplied and finally profoundly affected the system under the impulse of the so-called "blood-purifying" process.

Pathology.—According to Unna, most furuncles begin with an impetiginous lesion due to the inoculation of the pilo-sebaceous follicle with pus-cocci, the organism being, in the majority if not in all instances, the *Staphylococcus pyogenes aureus*. The cocci penetrate deeply into the follicle, into ramifications of the sebaceous gland, and into the surrounding tissue. An abscess surrounding the follicle is thus produced, which undergoes a necrosis *en masse*, producing the characteristic central core or slough. It is probable that in some instances the cocci are carried along the lymph-vessels to form abscesses about the neighboring follicles and glands. The lanugo hair-follicles are affected much more frequently than those of the stronger hairs.

Diagnosis.—Boils are to be distinguished from carbuncles by the aggravated symptoms of the latter. Circumscribed furuncular abscesses of the groins and the axillæ are not to be confounded with suppurating, sympathetic, or virulent buboes of these regions, associated with genital or extragenital contagious venereal sores. Errors of this sort have been made. Furuncles of the anal and genital regions in point of diagnosis may be significant of surgical affections of the neighboring parts (perineal, periprosthetic, periurethral, and scrotal abscesses in men; suppuration of the vulvo-vaginal gland in women).

Treatment.—The debilitated constitution of many patients affected with boils indicates clearly the need of a tonic regimen, including the administration of iron, quinin and strychnin, the mineral acids, and a generous diet of milk, cream, eggs, and fresh meats. To these articles of diet, wines and malt liquors may at times be added with advantage. Change of climate, of diet, of cooks, and of habits of life is most serviceable in cases of prolonged furunculosis. The mineral waters at some health-resorts prove especially valuable for the debility which often results from these disorders. The urine should always be examined for sugar, albumin, and an excess of urates. The internal remedies which possess reputation in this complaint are arsenic, sulphur, the alkalies, tar, fresh yeast in tablespoonful doses, phosphorus, and the syrup of the hypophosphites of calcium, iron, sodium, and potassium.

Calcium sulphid, which was once more highly esteemed than any other of the internal remedies named, is given in doses of $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0066–0.0133) every three or four hours. It is doubtful whether the drug exerts any influence whatever upon furuncles. In lithemia

potassium acetate or citrate is given in large dilution, or the liquor potassæ; in gout colchicum, salol, and the alkalies, including sodium salicylate. No one of these articles, however, may be described as an efficient and certain remedy for the complaint; many cases will progress without hindrance from any or all of them. Fresh brewer's yeast, recommended by Löwenberg, Crocker, Brocq,¹ Desfosses,² and others, is sometimes of service. A tablespoonful or less may be given three times a day.

Attempts in the direction of aborting a furuncle by the topical application of the stronger alkalies (aqua ammoniæ) or acids, caustics, cautery, ice, iodine, or phenol, or premature complete excision with the scalpel, occasionally succeed, but often they fail. Boils may be aborted at times by the injection beneath the lesions of from 3 to 6 drops of a 3 per cent. solution of phenol.

The objects of local treatment are to reduce the inflammatory process, allow the free escape of pus, and prevent infection of other follicles in the neighborhood. The surface of the boil and the skin in the neighborhood should be kept thoroughly clean by frequent use of hot water and green soap, and the application at least twice daily of some simple antiseptic solution, such as 50 per cent. alcohol, 1 per cent. phenol lotion, or weak bichlorid solution. Stelwagon³ recommends for the purpose:

R—Resorcin.,	gr. xv-xxx;	1-2	
Acidi borici,	ʒjss;	6	
Alcoholis,	f ʒj;	30	
Aquæ dest.,	f ʒv;	150	M.

Before rupture of the furuncle it may be protected by means of an ointment or paste containing ichthyol, 1 to 2 drachms (4.-8.) to the ounce (30.); or, by protecting the surrounding skin with such an ointment or paste, hot antiseptic applications may be applied to the lesion itself. A convenient and effective dressing at this stage is found in the official cataplasma kaolini, containing sterilized clay, glycerin, and a mild antiseptic. Such a dressing may be continued even after the opening of the furuncle, if care be taken to permit free discharge of the pus.

Jackson⁴ recommends boring into the boil, as soon as it has pointed, with a stick sharpened to a fine point, covered with cotton, and saturated with 95 per cent. phenol. The surface and surrounding parts are then cleansed with hydrogen peroxid, or a 1 to 1000 solution of bichlorid of mercury; after which a 5 to 10 per cent. salicylic-acid ointment is applied.

The furuncle should be opened freely with a clean incision when pus has formed, but not before. Violent squeezing of the furuncle to separate its slough or evacuate the contents should never be prac-

¹ La Presse med., 1899, lxi, p. 45 (with bibliography).

² Ibid., 1892, liv, p. 653.

³ Diseases of the Skin, 7th Ed., p. 411

⁴ Amer. Jour. Med. Sci., June, 1909.

tised, though it is permissible in some instances to scrape out the contents with a curette. The cavity should be cleansed thoroughly, at least twice a day, with hydrogen peroxid, or with a solution of phenol or mercuric chlorid, and packed with boric-acid, aristol, or other powder. In place of these powders, phenol in crystal or in strong solution may be employed.

In the chronic recurring lesions about the back of the neck, a moderate course of radiotherapy is a valuable method of treatment. Vaccine therapy is valuable in a certain proportion of cases, especially the chronic forms. Autogenous vaccines are preferred, though stock vaccines are often of much value (for technique, see section on General Therapeutics).

Prognosis.—Eventually, the worst cases are relieved, when unaccompanied by systemic or visceral disorders, and when the circumstances of the sufferer permit him to pursue the most advantageous course (travel, diet, and rest). The resulting cicatrices depend upon the severity of the process. Often they are small and in the course of years become scarcely distinguishable; in exceptional cases they are large, persistent, and disfiguring. Lympius¹ calls attention to the serious and even fatal complications (purulent arthritis, meningitis, thrombosis of frontal veins, septic infarct in lung) which may complicate furunculosis of the face, particularly of the upper lip, owing to the vascularity of the region.

CARBUNCULUS.

Synonyms.—Anthrax Simplex, Carbuncle. Ger., Karbunkel, Brand-schwär; Fr., Anthrax.

Definition.—A carbuncle is an acute, flattish, circumscribed, cutaneous and subcutaneous abscess, usually larger than a furuncle, that is due to the presence of staphylococci, and is characterized by dense induration and sloughing, terminating, in favorable cases, by the production of a persistent cicatrix.

Symptoms.—Carbuncles are often preceded by malaise, chill, and pyrexia of severe grades. There is commonly a burning pain at the site of the lesion. In cases in which the carbuncle is formidable and seated upon or near the head, alarming symptoms of prostration, stupor, somnolence, and even coma, may be noted. With and without these concomitants, a dense, dull-red, indurated, and painful phlegmon soon appears, varying in size from that of a small hen's egg to that of an orange and even much larger, involving not only the skin, but also the tissues beneath. Suppuration finally occurs, but the pus is not confined to a single space; it undermines the integument and often through several apertures leaks out indolently to the free surface. The fenestrated or cribriform appearance of the skin covering the carbuncle constitutes in this stage one of its most striking features. Through

¹ Deut. med. Wehnschrft., 1899, xxv, p. 474.

these apertures may be distinguished the whitish or yellowish pus-soaked sloughs or portions of a single slough, which can at times be extracted through the orifice. Often the entire mass separates in a single slough, involving the skin and subcutaneous tissues, leaving a crateriform ulcer of formidable size, which in favorable cases proceeds to heal by granulation. The resulting cicatrix is at first of a deep violaceous tint and later becomes blanched.

The fever which usually accompanies this process may be mild or be severe, or, more commonly in dangerous cases, be of a typhoid character. It results unquestionably from sepsis due to unliberated pus and necrotic tissue, and is naturally most grave in its consequence in patients weakened by previous asthenic disorders. Under these unfavorable circumstances, the carbuncle may spread at the periphery, enclosing islands of necrotic tissue and pus, separated by bridges of empurpled, infiltrated, and yielding skin.

The characteristic lesions of this disease most often appear on the back of the neck, the back of the trunk, and the lateral aspect of the hips and thighs, usually as a single lesion, though occasionally two or three carbuncles of small or of medium size may coexist. The reason for their appearance in the localities named is clear. It is here that the skin is most thick and resistant, and, as a consequence, purulent foci when formed are covered in by the most voluminous layers of the connective tissue of the corium.

Etiology.—Carbuncles are produced by the causes to which reference has already been made as probably effective in the production of boils. Carbuncles and boils may coexist; or the one lesion may follow the other; and there may occur intermediate forms assignable to either class. The disease is encountered more often in men than in women, and in later than in earlier life, simply because the tissues constituting its sites of preference offer in these individuals and at these ages a greater resistance to the exit of pus. The various pyogenic microorganisms found effective in furuncles are the direct exciting factors here. Carbuncles are at times an epiphenomenon in cachexia, diabetes, albuminuria, syphilis, pemphigus, and exfoliative dermatitis.

Pathology.—The pathological anatomy of carbuncle has been well described by Warren,¹ whose observations conclusively show that the inflammatory process here is that seen in the simplest pustule. The special symptoms of carbuncle are due solely to the formation of the phlegmon beneath the dense and extremely thick masses of fibrous tissue found in the back "for the protection of that comparatively defenceless portion of the body." The cell-elements, multiplying with the intensity of the inflammatory process in the subcutaneous adipose tissue, pass upward along the fat-columns, crowd between these, and push along the horizontal clefts branching from either side, infiltrate the derma, pass along the edges of the hair-follicles, fill the papillæ until the latter "balloon" with pus, ooze to the surface through the cribri-

¹ The Pathology of Carbuncle, or Anthrax. Cambridge, 1881, p. 15.

form aperture in the undermined epidermis, and mascerate the bundles of fibrous tissue, relatively intact, that constitute the undetached mass of sloughing tissue.

The constitutional symptoms in carbuncle (pyemic, septicemic, or sympathetic) are due solely to pus-absorption. The pus-formation is due to the presence of the *Staphylococcus pyogenes aureus* and its toxin. Back of all (in the diabetic and the cachectic) lies the favorable soil for multiplication of the microorganism.

Diagnosis.—It follows from what has preceded that carbuncle and furuncle differ solely in the depth of the starting point of the phlegmon, and the density and resisting power of the overlying tissue. The carbuncle, is, therefore, flatter, denser, less rapidly developed, larger, less tender, and more painful; it opens by many rather than by one or two apertures; and is followed by larger sloughs, ulcers, and cicatrices, and occasionally by fatal results.

Carbuncle is readily distinguished microscopically from anthrax by the demonstration of the *Bacillus anthracis* in the latter disorder.

Treatment.—Crucial and other deep incisions in the local treatment of carbuncle are certainly inferior in results to the course advocated by Wood¹ and Taylor,² whose method is employed in cases with complete success, as follows: A saturated solution of pure phenol is injected with a hypodermatic syringe through the several apertures in every direction into the sloughing tissues. When the orifices are not sufficiently numerous, the point of the needle is thrust through the thinned integument at the summit of the swelling at several points. The pain is severe but short-lived; the tissues are blanched, indurated, and destroyed; the slough in a few days is readily separated after division of its slender fibrous attachments; and the ulcer rapidly contracts, with the sequel of a smaller scar. It is necessary to use pure phenol in saturated solution to prevent absorption of the injected fluid and the resulting toxic effects.

Relief is afforded in many cases by hot borated lotions and fomentations; by carbolated lotions; extraction of the slough wholly or in portions with the forceps; and the subsequent employment of boric acid or the paste recommended in the treatment of furuncles. An excellent method of withdrawing the purulent and sloughing contents of the carbuncle is to apply over it at the proper period an exhausted receiver, such as a common cupping-glass.

Erision of the entire abscess with a curette and subsequent antiseptic dressing is an accepted radical measure of relief for employment in proper cases.

The antiseptic treatment of a carbuncle, however, furnishes the best results as regards the comfort of the patient and limitation of the disease. By this treatment there is absolutely no surgical interference with the lesion beyond the incisions made for the evacuation of pus. Violent squeezing and manipulation of the carbuncle are interdicted.

¹ Toledo Med. and Surg. Jour., December, 1880.

² Australian Med. Gaz., December 1, 1881.

It is freely powdered with boric acid, over which is laid soft felt cloth thickly spread with any emollient and antiseptic salve, such as the ordinary zinc-salve. Boric acid in powder or iodol, thickly dusted over the carbuncle and covered with antiseptic wool, will also be found a useful dressing.

Constitutional treatment may be demanded in carbunculosis, including the liberal employment of tonics, a generous diet, a strict observance of the rules of hygiene, and stimulants when indicated. Pyrexia, septicemic, pyemic, and adynamic states require the special management of such complications, including cold sponging of the body-surface in fever, and the use of quinin, the mineral acids, and stimulants, with artificially applied heat in the algid condition. The urine should always be examined for sugar and albumin.

Prognosis.—A serious issue need only be anticipated when the complications described above are grave in character or they occur in asthenic constitutions.

MULTIPLE ABSCESES OF THE SKIN OF INFANTS.¹

The disorder described by Fox under the above title is not common, but is of sufficiently frequent occurrence to render its recognition necessary.

Symptoms.—The abscesses characteristic of this disorder may occur on any region of the skin, but are found particularly over the buttocks, thighs, and back, and also about the occiput and on the hands and feet. The abdomen and chest are more rarely attacked. In number the lesions may be few or many; as a rule, before the attack subsides, large numbers have been present. It is stated that the whole body may become studded with them, numbering 150 or more. They are situated at different depths, some being superficial and others entirely subcutaneous. They vary in size from that of a pea to a pigeon's egg or larger, and suppurate freely. After rupture and discharge of the contents, the lesions heal, leaving a moderate scar. Some of the deeper lesions may only be felt. In infants of low vitality, whose nutrition has been much interfered with, ulcers or fistulæ may remain. Associated lymphangitis and a suppurative inflammation of the neighboring lymph-glands may occur. Gastro-intestinal disturbance may complicate the disorder, with associated loss of appetite and diarrhea. Cachexia and prostration may supervene and the process be terminated by septicemia or broncho-pneumonia.

Etiology.—The disorder, as a rule, occurs in infants of the poor, who are illy nourished, badly fed, and in unhygienic surroundings, though it may occur in infants of the better class whose vitality has been impaired by other causes. It occurs in both sexes. The direct cause is the *Staphylococcus pyogenes*.

¹ Colcott Fox, Allbutt and Rolleston's System, vol. ix, p. 199, from which the description in this text is largely taken.

Diagnosis.—The disorder is to be differentiated from abscesses due to tuberculosis and from syphilitic gummata. It is differentiated from the former by the absence of the tubercle bacillus and the presence of the *Staphylococcus pyogenes* found in deeply situated lesions. In addition, there are no other evidences of tuberculosis than the presence of cachexia. The gummata of syphilis present lesions showing more induration, and are rare in infancy.

Treatment.—The treatment consists in incision of the abscesses, either with a knife or by igni puncture, after which they are dressed in accordance with the principles of surgery. Particular attention is to be paid to the general care of the patient relative to the diet, and, in the way of prophylaxis, strict cleanliness of the entire body-surface.

Prognosis.—The prognosis varies; in mild cases, and even in some of severer grades, recovery takes place. In neglected cases and those with bad surroundings, the prognosis is grave.

PHLEGMONA DIFFUSA (CELLULITIS).

This is a suppurative inflammation of the subcutaneous tissue caused by a streptococcic infection. Frequently the infection enters through a discernible wound of the skin, but it may occur without previous lesion.

Symptoms.—In severe cases the disease begins with a chill and elevation of temperature. Usually, the first evidence of the disease is a stinging sensation at the point of infection, which develops so suddenly and so closely simulates the feeling produced by an insect-bite that the patient insists that he has been stung. The physician should exercise due caution in accepting such statements.

The lesion which first appears is a red nodule situated deeply in the derma or subcutaneous tissue. Movement of the subjacent muscles causes pain. The redness soon spreads until it involves an area the size of the palm of the hand, and the original nodule assumes a bluish color, so that there is presented a bluish nodule surrounded by an area of redness. The outer red area never presents a distinct outline, but blends gradually with the healthy skin. The reddened area is infiltrated, hard, pasty-like; and pits on pressure. The central nodule becomes capped with a vesicle, ruptures, and discharges pus and necrotic tissue, much to the relief of the patient. Painful streaks of lymphangitis extend to the neighboring lymphatic glands. Where the skin becomes gangrenous (gangrenous phlegmon), the danger of sepsis is so great that immediate operation is the advisable procedure. Metastatic abscesses may develop.

Treatment.—The lesion should first be treated with hot, moist dressings. When the fever continues and the inflammation spreads, surgical interference is needed. The operation is not to be undertaken lightly. It is often necessary to open deeply between muscles. In some cases amputation is necessary to save life.

DISSECTION-WOUNDS AND ANIMAL POISONS.

Aside from verruca necrogenica, or anatomical tubercle, described in the chapter on Tuberculosis Cutis, lesions generally known as "dissection-wounds" occur, with symptoms of acute poisoning, upon the hands of those exposed in post-mortem examinations and dissections. At the inoculation-point, which may be either the site of a former abrasion, a rent, or the mouth of an open follicle, a painful vesico-pustule, papule, tubercle, wart, furuncle, or hemorrhagic bulla rapidly rises from an angry and indurated base with hyperemic areola of dull-red shade. Suppuration, crusting or ulceration, limited to the seat of the lesion, may follow; or there may occur lymphangitis in various grades, with consequent pyemic or septicemic involvement of the system. Suppurative and non-suppurative axillary buboes are common. Gangrene and necrosis of the soft parts and the bones, especially the phalanges, may ensue, as may also a fatal result from the systemic disorders named. Rarely an acute and fatal septicemia may result when the lesion at the point of inoculation is so slight as to pass unnoticed. In a few cases chronic marasmus is induced.

Post-mortem pustules originate from infection with cadaveric poisons in the dissecting-room or dead-house. An itching macule, either at the site of an abrasion or elsewhere, soon develops, and is transformed into a vesico-pustule with a reddish halo, which bursts, and is covered with a crust, beneath which pus repeatedly forms. Occasionally, there is coincident adenopathy.

The nature of the infection varies in different cases. It is most commonly due to pyogenic bacteria, but may be caused by the specific microorganisms of tetanus, erysipelas, anthrax, or other infectious disease. The absorption of toxins resulting from the decomposition of animal tissues is undoubtedly an important factor in the infection.

Treatment.—The wound should be cleansed and opened and a moist dressing of alcohol 3 parts and water 1 part applied both to the wound and the accompanying lymphangitis.

Gayle.—Crocker,¹ under this title, describes an affection of ewes in the lambing season, who are liable to a species of puerperal disorder undoubtedly infective. Men who have skinned the animal dead of the disease have suffered by inoculation. The lesion produced at the site of the infection is a flat-chambered vesicle or bleb, slightly depressed at the centre, a centimeter or more in diameter, bluish-gray in color, surrounded by a halo, and containing clear or blood-stained serum. There is apt to be axillary adenopathy, and the hand may swell. Klein has demonstrated the *Staphylococcus hemorrhagicus*. In some cases there are pain and mild fever.

Treatment.—Treatment has been by sublimate lotions.

¹ Diseases of the Skin, 3d Ed., 1903, p. 509.

ANTHRAX.

Synonyms.—Malignant Pustule, Splenic Fever Carbuncle. Fr., Pustule maligne, Charbon; Ger., Milzbrand, Milzbrand Karbunkel.

Definition.—Anthrax maligna is a carbuncular lesion resulting from infection of the skin or other organ of the body with a virus containing the anthrax bacillus, furnished by an animal infected with splenic fever.

This form of the disease in man, fortunately rare of occurrence, results from external inoculation, and, excepting a few cases of accidental post-mortem inoculations and by the prick of a hypodermic needle (Sée), is derived from animal products, such as wool and hair, or from animals affected with the specific malady variously termed "anthrax," "charbon," "splenic fever," "splenic apoplexy," or "Texas fever." After inoculation with the disease from an infected animal, the human subject may (a) perish from systemic poisoning, wholly septicemic in character, with few external symptoms; or (b), when life is sufficiently prolonged, may suffer from visceral symptoms, and develop subcutaneous tumors; or (c) may exhibit the symptoms of the disease now under consideration.

Symptoms.—In from twelve hours to three days after inoculation, a painless, somewhat itching macule, resembling a flea-bite, first is manifested, usually upon the dorsum or other part of the hands, or the face, to which the virus has had access. The macule is followed in from twelve to fifteen hours by an inflammatory and pruritic papule, which is transformed rapidly into a flaccid bleb filled with a bloody serum. Usually the patient ruptures the bleb, exposing the base to view. At this point, the third or fourth day of the disease, the cutaneous lesion is fully developed. It consists of a plaque, the centre of which presents a yellowish or blackish colored eschar, surrounded by a collar of redness, studded with a few pustules. On palpation, the plaque is found to be of cartilaginous hardness, extending deeply into the subcutaneous tissue and gradually merging into the surrounding tissue. Associated with this lesion is an extensive edema, involving an entire arm, the trunk, or face, according to the location of the plaque. An edema out of all proportion to the lesion with which it is associated is always suggestive of anthrax.

To complete the diagnosis, a drop of pus from a pustule or, in its absence, fluid from the red area, is drawn into the needle of a hypodermic syringe to be examined microscopically, the operator observing due precaution in the operation. The bacilli stain readily with fuchsin.

The adjacent lymphatic glands enlarge and often suppurate; metastatic abscesses form; and the constitutional symptoms supervening are those described in connection with Equinia. If recovery is to ensue, the gangrenous mass will slough, as in favorable cases of carbuncle; if the result is to be fatal, the process rapidly is aggravated by edematous infiltration extending to a wider area, and by greater tissue-necrosis.

In some cases the accompanying fever is high, with marked delirium; in other cases it is of a typhoid character. Death results from shock, septicemia, or exhaustion, though in cases in which the lesion is circumscribed and unattended by constitutional symptoms recovery may ensue.

Etiology.—This disease is induced by infection of herders, ranchmen, and others from one of the lower animals, usually horned cattle, that suffer from charbon or splenic fever. The susceptibility of the carnivora to the disease is very much less than that of the herbivora. It is claimed that not only direct inoculation may produce the disease, but that it may be transmitted through the medium of flies and other insects. More recently it is asserted that food, drink, and even inspired air, may be the medium by which the disease is conveyed. The victims are chiefly male adults.

Pathology.—Since the first investigations reported in 1864 by Davaine to the French Academy, Pasteur, Klebs, Koch, Carnevin, and others have demonstrated that splenic fever is solely due to the

FIG. 82



Malignant pustule bacilli and pus-corpuscles. (About $\times 300$.)

multiplication in the blood and tissues of a rod-shaped bacillus, the *Bacillus anthracis*, which is non-motile and measures from 1 to 1.25μ in breadth and 4.5 to 10μ in length. Under culture the bacilli may develop long filaments many times larger than the original rods, with a distinct capsule about a protoplasmic cylinder, which filaments after segmentation furnish oval, shining spores. These spores have been cultivated in generations, with resulting germs that produced the disease artificially in the lower animals.

The pathological anatomy of malignant pustule is that of carbuncle, with the added fact that specific bacilli and spores are everywhere present in the blood and debris of tissue. There is an almost characteristic edema of the papillary body, according to Unna; the margin of the epithelium is well preserved; and there is an acute vesicular elevation of the horny stratum, without a previous breaking up of the connective-tissue layer, which induces a stretching of all the cavities in a vertical direction.

Diagnosis.—The characteristic features of typical malignant pustule are its central eschar, its crown of vesicles, and its indurated base. In establishing a diagnosis, care must be taken to avoid one source of error. Malignant pustule in man is not of frequent occurrence in America, but occasionally various cutaneous eruptions are produced upon the hands after contact with animals or their hides upon which chemical solutions have been applied for the destruction of lice. These solutions usually contain arsenic, corrosive sublimate, or other substance capable of exciting a localized dermatitis. Chancre of the face, carbuncle, and poisoned wounds are all differentiated by their relatively indolent course and the absence of gangrene.

Treatment.—The treatment is to be conducted on the principles of general therapeutics. Deep incisions of the lesion, extended to the subcutaneous connective tissue, are often successful when practised before the occurrence of general symptoms.

Successful results have also been obtained from incision and iodoform dressings. Hebra was not in favor of early cauterization of the malignant pustule, and it may be considered a questionable method of procedure. A grave case of malignant anthrax is recorded in which recovery ensued after hypodermatic injection of tincture of iodine. Three syringefuls of pure tincture were deposited beneath the skin at the periphery of the diseased surface, and lint saturated with the same fluid was applied over the slough. Internally, 15 drops of iodine tincture (1.), with 3 grains (0.2) of potassium iodide, were also administered. Normal cicatrization followed in this and 6 other cases recorded.

Crucial incisions, with the free application afterward of pure phenol, have been followed by good results. Internally, sodium hyposulphite and quinine are successfully employed. The febrile, typhoid, and adynamic features of the disease are to be treated in accordance with the recognized principles of general medicine.

A specific serum elaborated by Sclavo in Italy¹ is used both as a prophylactic and curative measure. In a series of 164 cases treated by this method, a mortality of 6.09 per cent. is recorded. This serum is largely used in England, with much success.

Prognosis.—The disease is grave, the mortality depending upon the treatment instituted. Early complete excision and serum therapy promise best results.

EQUINIA.

Synonyms.—Glanders, Farcy, Malleus. Fr., Morve, Farcin; Ger., Rotzkrankheit, Maliasmus.

Definition.—Equinia is a contagious, virulent, and inoculable disease, transmitted to man from the horse, mule, ass, or other animal; and produced by a bacillus resembling that of tuberculosis. It is conveyed either directly or mediately by the application of cloths and other articles which have been in contact with the bodies of infected animals.

Symptoms.—The acute form of this disease commonly follows a period of malaise lasting a few hours or a few weeks, during which period the patient complains of vague pains of a rheumatoid type, followed by thermal variations. The body-temperature rises rapidly to the point of danger, with chills, diarrhea (often following constipation), and rapid exhaustion; the picture being suggestive of acute septicemia.

The cutaneous symptoms begin often with an erysipelatoid blush, the infected and swollen surface also producing papules, vesicles, pustules, and bullæ, with dense, ill-defined induration of the subcutaneous tissue; or reddish and yellowish papules appear, which, as in the case of the fluid-containing lesions, coalesce and furnish a bloody discharge. These

¹ Quoted from Osler's *Modern Medicine*, vol. iii, p. 51.

symptoms, in the case of inoculated disease, may develop on the site of the healed or healing wound of entry of the virus, and later become generalized. Sloughing ensues more or less rapidly, sometimes with extensive gangrene, though the patient often succumbs before the culmination of the morbid process. The lymphatic vessels are swollen and well defined, often indurated nodules ("farcy-buds") forming in the

FIG. 83



Characteristic lesions in syphilis. — Howard M. Brown

lymph-glands and channels. These symptoms chiefly affect the face, hands, feet, and other exposed parts of the body. There is often a sanious or purulent and offensive discharge from the nostrils, the mouth, and the eyes, the inflammatory process spreading rapidly to the deeper mucous surfaces. This catarrh, chiefly nasal in site and declared conspicuously by the nasal voice, due to the blocking up of the nostrils by the viscid, foul-smelling, hemorrhagic discharge, is one of

the most characteristic features of the malady, and is of importance in the diagnosis.

In the chronic form of the disease the nasal catarrh is less conspicuous at the outset, though later it may be a prominent feature of the malady. A few days or weeks after infection, pustules, as in the acute form, resembling those of variola, but flattened and never umbilicated, begin as vesicles or even as papules, coalesce to form bullæ, occur in successive crops, and proceed to the production of multiple abscesses, which are poorly defined on the extremities and about the face. They occur rarely on the trunk. These abscesses may be of phlegmonous type; or be deep, brawny infiltrations with purulent foci, which may persist for several months. From these abscesses, pea- to nut-sized over the face, larger on the limbs, flows an abundant, semiliquid or viscid, yellowish, offensive pus. Ulcers form at many points, with purplish borders, oval or roundish contour, and thin edges, suggesting the scrofulous ulcer of classical type. The edges may be soft or indurated. By this multiplication or coalescence, the lips, nose, eyelids, and other parts of the face may be destroyed, in part or wholly. The disease may steadily advance, or may seem to be arrested for a time and reawaken to activity. Meantime, the lymphatic glands are either unchanged or are enlarged by sympathy. In the course of months or years there is a fatal issue. The disease is, fortunately, rare.

Meyer and Crohn¹ fully reported a case of acute glanders from New York City in 1907, and Bevan and Hamburger² reported 3 cases occurring in Milwaukee in the same year. A fatal case occurred in the Presbyterian Hospital of Chicago, in 1908, in a physician infected from laboratory cultures with which research work was being performed.

Etiology and Pathology.—Equinia is almost invariably produced by infection from horses, hence a history of contact with such animals is one of the important points in establishing a diagnosis, though rarely it is transmitted also from man to man. The infection is produced by the *Bacillus mallei* (Weichselbaum, Schütz, Löffler, Bouchard). This organism is nearly of the size of the tubercle-bacillus, but is decolorized by acid alcohol and is Gram negative. It is readily cultivated and produces the disease in the lower animals (except cattle and house rats) after injection of cultures. The bacilli are abundant in papules, abscesses, blood, and brain-tissue.³

Diagnosis.—In all cases the clinical diagnosis should be substantiated by the Strauss⁴ method. An agar-agar culture of the glander bacillus or secretion from lesions is injected into the peritoneum of a

¹ Acute Glanders. Report of a case, with review of recent literature and a complete bacteriologic report. Jour. Amer. Med. Assoc., 1907, i, pp. 1593-1595. (A complete report, including reference to 9 additional cases reported to the New York Board of Health during the two preceding years.)

² The Occurrence of Glanders in Man. Ibid., 1907, i, pp. 1595-1599. A full report, clinical and bacteriologic, of 3 cases (bibliography).

³ Coleman and Ewing, Jour. Med. Resch., 1903, ix, p. 223 (report of case, with autopsy, histological and bacteriological findings, and bibliography).

⁴ Archives de Méd. expér., 1888.

male guinea-pig. Within seven days an orchitis develops, from which the bacillus may be recovered.

Treatment is that of the septic condition, and is of little avail.

Prognosis is grave in the highest degree.

ERYSIPELAS.

Synonyms.—St. Anthony's Fire. Ger., Rothlauf, Erysipel; Fr., Erysipèle, La Rose.

Definition.—Erysipelas is a contagious and infectious disease of the skin and subcutaneous tissue, characterized by redness and swelling of the parts attacked; at times associated with vesicular and bullous lesions, and accompanied by constitutional symptoms.

Symptoms.—This disease is usually preceded by a prodromic period of malaise (lasting for twenty-four hours or less), which may be ushered in by one or several chills, followed by febrile symptoms. The latter are accompanied by anorexia and often by vomiting, with general depression and headache.

The eruptive symptoms are generally first displayed at a given point, from which the disease progresses. It is commonly first noticed in a nut- or egg-sized patch, the integument of which is tumid, slightly elevated, irregular in contour, distinctly circumscribed, without peripheral islands (these are of importance in the diagnosis of erysipeloid), and which presents a rosy or crimson-reddish color, with a peculiarly smooth, characteristic shining or glazed appearance. The sensations awakened may be those of moderate itching, of pain, heat, or burning. To the touch the affected part is tender, moderately firm, and perceptibly hotter than normal. The color fades under pressure to a yellowish white.

In typical cases the erysipelatous blush and swelling spread over an area which may be of the size of the palm, or may even cover the surface of an entire limb or large area of the body. In cases of moderate grade, the inflammation attains a maximum of extent and severity within a week, remains apparently unaltered for a day or more, and then begins to abate, with amelioration of all the concomitant symptoms. The fever, which often precedes the eruption, continues unabated during its progress, the temperature rising to 105° or 106° F., with nocturnal exacerbation, cephalic and lumbar pain, dryness of the tongue, gastric distress, and occasional delirium. As involution of the disorder is accomplished, the redness is replaced by the brownish, bluish-red, and dirty-white shades often seen after the disappearance of erythema multiforme, the epidermis finally desquamating in various degrees, according to the extent of the preceding inflammation.

In other cases, in which the exudation of serum beneath the epidermis has been rapid, the latter is raised in the form of vesicles, pustules, or bullæ, more often the latter; and, precisely as in the severe forms of dermatitis calorica, with which erysipelas presents a certain analogy, gangrene of the skin may result in the part affected. This

complication is particularly liable to follow the disorder when it attacks the seat of surgical wounds and injuries.

Not infrequently new areas become involved every few days, with a corresponding increase of the constitutional symptoms; and thus the disease may travel over a large part of the cutaneous surface, with, however, only moderate-sized areas showing activity at any particular time.

Surgical accidents aside, the face is the commonest seat of the disease, on which the blush may be first seen upon one side of the nose, a cheek, a lip, or an eyelid. It often attacks the lobe of the ear after the operation of piercing the lobule for the insertion of ear-rings in women; thence it may extend over the whole face, inclusive of the mucous linings of the mouth and the nose, which present a dry, tumid, and glazed appearance, suggestive of the symptoms displayed upon the skin. The inflammation may extend to the hairy parts, but in many cases it exhibits a species of reluctance to transgress the limits there presented. It may be noticed in cases of mild grade, in which no applications have been made to arrest a local progress, that the elevated border spreads symmetrically to within a few lines of the male beard or the hairs at the edge of the forehead, and there is arrested. In severer grades these limits are exceeded, and then, as a rule, the extension is rapid and formidable. In this way the entire head may become enormously swollen, suggesting to a casual observer that it is twice its normal size. The patient then is greatly disfigured; his lips are scarlet, swollen and parted, permitting the escape of saliva; the ears, as usual when greatly enlarged, project in a marked degree from the side of the head; the eyelids are edematous and incapable of separation; the face is disfigured by bullæ or crusts; and the mind is disordered in the violence of the fever or the accessions of delirium. When recovery ensues the hairs generally fall.

All regions of the body may be invaded, such as the vaccinated arm, the leg the skin of which is involved in venous varicosities, the scrotum or the umbilicus of the infant, the genitalia of the newly-delivered woman, the breast of the nursing-mother, and every surface which has been the seat of punctured, incised, contused, or poisoned wounds, or other accidents of the integument, to which the germs of the disease may have had access.

The febrile symptoms are, throughout, persistent and characteristic of a specific toxemia. The body-temperature, as has been said, may reach 105° to 106° F., with vespertine exacerbations and remissions; it may also become subnormal. If not relieved in the course of seven or eight days, complications may be expected, namely: edema, abscess, phlegmonous inflammation, gangrene, or inflammatory accidents involving the membranes of the brain, lungs, heart, bowels, kidneys, peritoneum, or joints, together with coma and delirium. Death may result from the complications or from shock, exhaustion, or pyemia.

Erysipelas Ambulans.—This is a term used to describe that form of the affection which, after involving a given area, spreads with greater or less rapidity to the parts in the vicinity, either by direct extension

and uniform advancement in one direction of the tumid and distinctly circumscribed border, or by linear, digitate, or irregular prolongations radiating from the inflammatory focus. As the blush and swelling advance in one direction, there is usually a correspondingly rapid disappearance in the other. At other times the disease, while extending to a new area and abandoning the old, is relighted in the latter; and thus an irregularly involved and irregularly extending inflamed surface presents for weeks the varying phenomena of the disease. In yet other cases, chiefly those in which there has been a history of traumatism, a linear streak or band may spread from the site of the traumatism in one direction or another, suggesting the indurated lines observed in lymphangitis.

Chronic Erysipelas.—Habitually recurrent and indolent erysipelatous attacks, the identity of which with the disease here described is difficult to establish, occur frequently. Some of these cases are due probably to repeated infection with bacteria which may be attenuated or less virulent forms of the cocci found in the severe types of erysipelas. Many cases, however, reported as "chronic or recurring erysipelas" are instances of eczema, dermatitis, or rosacea, which are subject to acute exacerbations. Instances occur in which the face, wholly or in part, is the seat of a low grade of inflammation, with local heat, swelling, redness, considerable infiltration, and some tenderness, the skin being irritable and worse after exposure to a high wind or after excesses at the table. But most of such cases fail to exhibit the distinct imprint of erysipelas. They are not only chronic in course, but are also exceedingly indolent, often lasting for years. They are unaccompanied by fever; are limited distinctly in all accesses of aggravation to the same part of the face; are characterized rarely by a bullous efflorescence; many occur in the subjects of chronic alcoholism; and the specific germs of erysipelas are not present.

Etiology.—Erysipelas is caused by the streptococci of Fehleisen, or other organisms, which gain admission to the tissues through some lesion of the surface. The site of infection may be a surgical or other wound, or it may be a slight scratch or an unrecognized abrasion of the skin or mucous membrane.

In the face, catarrhal and ulcerative processes involving the mucous membrane of the mouth, ears, and nose are often the cause of erysipelas, these processes occurring in a wide range of disorders, from syphilis of the nasal bones to caries of the teeth. Tuberculous and other ulcers, as well as eczema and several other skin-diseases, frequently furnish a means of ingress to the streptococci. Injuries of, and surgical operations upon, the scalp not conducted with antiseptic precautions, and the common piercing of the lobe of the ear in women and female children for the insertion of ear-rings, may be followed by the appearance of the disease upon the scalp, as a result of which the hair often falls. Fistules, vaccination, lesions of the tender umbilicus of the newborn infant, and railway accidents may be named as common causes of the disease in other regions.

Predisposing causes of this disease are to be sought for in cachexia, general debility, alcoholism, kidney-disease, epidemic influences, traumatism, violation of hygienic rules, idiosyncrasy, and occasionally the recurrence of previous attacks.

Jordan¹ and others have demonstrated apparently that the disease, in both mild and severe forms, may be produced by staphylococci as well as by streptococci. Jordan has shown that typical erysipelas may be produced in the rabbit by a number of different cocci.

Pathological Anatomy.—The disease is an acute inflammation of the skin and of the subcutaneous tissue. Unna, whose examinations were made largely of the skin of children and infants, found invariably a simultaneous invasion of both the cutis and the hypoderm in erysipelas, the former recovering far more rapidly than the latter, and rarely reaching such a grade of activity. The venous capillaries were all enormously distended, as if paralyzed by the poison present, and the collateral lymphatics with the lymph-spaces were equally dilated. All the cutaneous vessels swarmed with streptococci, both in the central and the marginal zones.

Diagnosis.—Erysipelas is to be distinguished from the erythemata, from dermatitis of various grades, from eczema, and from scarlatina. As a rule, its recognition is readily effected when the presence of the fever in erysipelas is kept in view, as also the peculiar shining, swollen, and rosy-reddish to damask hue of the affected parts. The redness is never produced, as in scarlatina, by multiplicity of reddish puncta, nor is it also widely diffused as in that disease. Erysipelas may at times be accompanied by a pruritic sensation, but the patch which it affects is never by any possibility scratched. By this simple test alone one may often distinguish an erysipelas of the face from an eczema of the same region in a child. From a chronic dermatitis, with thickening of the affected tissues and redness of the surface, erysipelas is to be distinguished by its tendency to spread, by its acute course, by its frequent association with bullous or vesicular lesions, and by the color, outline, and raised border of the affected patch. However, it must be understood that to these localized patches of chronic dermatitis several authors have given the name "chronic erysipelas," the difference between the views held on this point being chiefly one of titles.

Treatment.—The method of treating erysipelas by the administration of tincture of iron internally has long been popular among American practitioners, but its efficiency is questionable. This preparation is given in full doses, from 10 to 50 drops, day and night, every two to three hours, irrespective of the febrile state.

The constitutional treatment is important, but is solely symptomatic, and should be directed to lowering the temperature, to obtaining proper functional activity of all the organs of the body, and, in prolonged cases, to sustaining the strength of the patient. Locally,

¹ Münch. med. Wehnschrft., 1901, p. 1371.

no matter what application is made to the surface, the affected area should be covered with gauze and bandaged. Equal parts of ichthyol, lanolin, and vaselin make a very satisfactory dressing for the average case. It may be applied once or twice daily. Fraser¹ uses pure phenol. As soon as the skin becomes white, it is mopped with absolute alcohol. The purpose of such treatment is to limit extension of the disease. It is true that these measures will not always succeed, but it is erroneous to assert with some authors that they always fail. Certain it is that, whether effective or not in the production of the result, the advancing border of the disease will often fail to exceed the limits thus artificially described. Heppel² recommends the painting over the surface of a 10 per cent. solution of phenol in alcohol, as an abortive treatment, for which Braithwaite³ substitutes a solution of tannin of the same strength.

Good results have been reached in the local treatment of erysipelas, first, by attempting to limit the extension of the disease by the application of the tincture of iodine over the peripheral zone; and, secondly, by retaining over the entire affected surface neatly applied compresses saturated with a solution of sodium hyposulphite in the strength of about 1 drachm (4.) to the ounce (30.), or with 95 per cent. alcohol.

Attempts to limit extension of the disease by local applications of an irritating sort (corrosive sublimate, silver nitrate, phenol, tar, or turpentine) are sometimes positively injurious. Dry heat applied by the aid of cotton or wool, cold compresses, or iced lead-lotions, with intermissions of application, salicylic acid, boric acid, iodol, resorcin in solution, or iodoform in powder, may be used. A 95 per cent. alcoholic or a saturated solution of boric acid often gives good results if painted frequently over and for an inch or more beyond the affected area, or if applied on compresses.

Koch applies 1 part of creolin, 4 of iodoform, and 10 of lanolin, covered with gutta-percha. Hallopeau praises 1 part to 20 of sodium salicylate in aqueous lotions upon folds of linen. Tabit claims to abort the disease with a 10 per cent. solution of iodol in collodion. Injections of antistreptococcic serum have been used with varying success.

It is needless to add that all surgical indications are to be fully met when they are present: pus is to be evacuated, crusts removed, and drainage secured.

Prognosis.—Under favorable circumstances erysipelas, even of severe grade and extensive invasion, terminates in complete resolution. Reserve should be made, however, in every case, as a serious complication has often transformed the simplest into the gravest form of the disease. The very young, the cachectic, the victims of drink, the aged, the inmates of hospital-wards depressed by other illness, and those mentally distressed by destitution and neglect, are particularly liable to suffer from grave and fatal forms of the malady.

¹ Brit. Med. Jour., 1901.

² Arch. of Derm., April, 1881, p. 147.

³ Brit. Med. Jour., April, 1881.

ERYSIPELOID.

Synonyms.—Erysipelas Chronicum, Progressive Phlegmon, Crab Cellulitis, Erythema Serpens, Erythema Migrans.

Definition.—This term is employed by Rosenbach¹ to designate a special inflammation of the integument occurring as a complication chiefly of traumatisms.

Symptoms.—When a wound is infected with the special poison of the disease, a peripherally spreading, tumid, and empurpled halo encircles the site of infection, which slowly disappears in the part originally attacked, while it extends progressively to another area. The advancing border of the disease is distinctly circumscribed, and may be festooned or scalloped. New points may appear, from which the violaceous redness spreads, while others are in a state of apparent inactivity. This affection may be complicated with furunculosis, but scaling is said never to occur. Itching and burning sensations are usually present. The disease is unaccompanied by general symptoms and tends to spontaneous recovery in a few weeks. The disorder affects chiefly the fingers and hand (according to Elliot, also the scratched toes) of scullions, meat-dressers, fish-dealers, poultry-cleaners, and persons of similar occupations.

Rosenbach believes that the source of this disease is a microörganism of the order *Cladothrix*, existing in putrid flesh and cheese, from pure cultures of which organism he is reported to have induced the disease. In a careful study of 323 cases, Gilchrist² found the disease followed a bite or other injury from a crab, the process beginning about two days subsequent to the injury. In only five cases was there any glandular involvement.

Pathology.—Gilchrist found in sections an acute inflammatory process involving the corium, and to a slight degree the subcutaneous tissue. There was a small lymphoid cellular infiltration about the blood-vessels, with numerous polynuclear leukocytes throughout the corium. The sweat-apparatus was particularly involved. The epidermis was edematous and contained some polynuclear leukocytes. Carefully performed inoculation experiments were negative, and no microorganisms were found to account for the disorder. He concluded that the disease might be due to a ferment inoculated into the skin by the crab. Adamson,³ in two cases examined, found no microorganisms.

Diagnosis.—The disorder is to be distinguished from eczema, erysipelas, and dermatitis repens. The activity of the symptoms, the presence of vesicles, and marked itching in eczema make the distinction. From erysipelas it is differentiated by lack of constitutional symptoms, and by the presence in the former of the streptococcus. Dermatitis repens is a much more chronic disorder, and is characterized by a raised vesicular border.

¹ Verhandl. der deutsch. Gesell. f. Chir., 1887, xvi, p. 75.

² Jour. Cut. Dis., 1904, xxii, p. 507 (complete literature).

³ Brit. Jour. Derm., 1908, xx, p. 367.

condition very similar to that of dermatitis repens, in that it begins on, and often is limited to, the extremities; it originates frequently in a traumatism; begins often as a vesicle, spreading peripherally; and is rebellious to treatment. Hallopeau describes vesicular, bullous, and purulent types.

The disease begins frequently on a finger, to which it may be limited for weeks before it commences to spread. On rupture of the vesicles or pustules, a reddened surface is left similar to that seen in dermatitis repens. The condition differs from dermatitis repens in the frequent appearance of secondary eruptions, often pustular in form, even on portions of the body at a distance from the region first affected, and larger areas frequently are formed by the coalescence of a number of foci. The secondary eruption may be in the form of an exfoliative erythema, and may involve symmetrically considerable portions of the body. The disorder further differs from dermatitis repens in the tendency to recur frequently in the same place. It is also more persistent, and occasionally terminates fatally. The author had under observation a case of this sort for a period of one and one-half years. Constant recurrence in the primarily affected areas was noted. Temporary improvement frequently occurred, but eventually the disease resisted all treatment. From the description given by the attending physician, the patient appeared to have succumbed to a generalized exfoliative dermatitis.

This disorder is allied closely, both etiologically and pathologically, to dermatitis repens. Sutton¹ believes they are identical, and his sections show little difference histologically.

Treatment.—The treatment is practically the same in both disorders. For the latter, Hallopeau recommends a solution of silver nitrate, 1 drachm (4.) to the ounce (30.).

POMPHOLYX.²

Synonyms.—Cheiro-pompholyx, Dysidrosis. Fr., Dysidrose.

Definition.—Pompholyx is an acute or subacute inflammatory disease affecting the skin of the hands and feet, occasionally also contiguous parts, where variously sized, grouped, vesicular and vesicobullous lesions develop, characterized frequently by recurrence.

This disorder has been the theme of no little discussion. It was described first by Tilbury Fox, in 1875, Hutchinson reporting on the same case.

Symptoms.—The disease affects simultaneously and, as a rule, symmetrically the hands and the feet; if either members are spared, it is

¹ Loc. cit.

² Literature: Tilbury Fox, *Amer. Jour. of Derm.*, 1873, p. 1; also *Brit. Med. Jour.*, September 27, 1873. Hutchinson, J., *Ill. Clin. Surgery*, 1876; London, Fasc. iii, Pl. x. Robinson, *Amer. Archiv. Derm.*, 1877, iii, p. 289; also *Morrow's System*, vol. iii, p. 182 (Art. Pompholyx, by Robinson). Crocker, *Trans. Path. Soc. of London*, 1878, x, 19. Levisseur, Contribution to the Clinical Aspect and Treatment of Pompholyx (Dysidrosis, Cheiro-pompholyx), 14 cases, *Jour. Cut. Dis.*, 1905, xxiii, pp. 432-439.

commonly the feet. One side may be involved more extensively than the other. The eruption is preceded or is accompanied by a burning or a tingling pain, rarely with severe itching, and is characterized by the appearance on the dorsum, the sides of the fingers, over the palms and soles, or over the whole hand or foot, of deeply set, single or numerous, grouped or confluent, pinhead- to bean-sized vesicles, or vesico-bullæ. According to Fox, in the earliest stages of the vesicles annular collections of fluid may be seen about the sweat-pores. The appearance of well-developed lesions is compared with that of boiled sago-grains imbedded within the skin. When the bullæ attain extreme development, the distended lesions project from the skin, being irregularly outlined and containing a neutral or an alkaline fluid, translucent or turbid, and seated on an edematous, often exquisitely painful and sensitive, skin. The bullæ are

FIG. 84



Dysidrosis. (Howard Fox.)

said not to rupture spontaneously, but to undergo absorption in a fortnight or more, with exfoliation of the loosened epidermis; but there are well-marked exceptions to the rule. Beneath the purposely ruptured bullæ is a new-formed and reddened, or exfoliated and sodden (which under favorable circumstances becomes later a sound) epidermis. There may be coincident malaise, thermal changes, marked mental despondency, or hebetude. Hyperidrosis may be a prominent feature in the case of affected patients before and during the occurrence of the disease. There may be recurrent attacks in consecutive seasons, and also recrudescence of the disease in the affected. Mild types of the disease, with only a few groups of the sago-grain-like vesicles, occur and recur, which may or may not develop into the typical picture above described. Occasionally, also, the typical picture may be altered by secondary pyogenic infection. At times an apparently eczematous condition may spread up the

forearm or occur on other parts. This condition is said by Pringle and Adamson¹ to be due either to pyogenic complications or an associated miliaria rubra or prickly-heat, conditions closely allied to pompholyx. In Levisseur's observations, the nails were shed in two cases.

Etiology.—The disease is somewhat rare, and occurs rather more often in women than in men, though both sexes are attacked. The ages extend from childhood to middle life; one well-marked case occurred in a man of sixty. The sufferers, with but few exceptions, are in poor health, are broken down from nervous overstrain, and are neurasthenic rather than cachectic.

The disorder is in certain subjects due to strictly inherited tendencies. We have had under observation typical cases in the persons of a mother and two children, one of the latter a girl, all of whom had suffered since birth from successive crops of vesico-bullous lesions, with hyperidrosis of the hands and feet. The heart of each was in an irritable state, the pulse rate of the mother having been repeatedly registered at 122 to the minute. All three patients complained of gastric crises.

Pathology.—The differences among observers respecting the character of the disease depend upon whether the view is taken, with Fox, Crocker, and others, that the vesicles lie directly connected with or in the line of the sweat-duct; or whether, with Hutchinson, Robinson, Williams,² Santi,³ and Sutton,⁴ no connection with the coil-glands is recognized, the vesicles lying in the superior portions of the rete over the papillæ, and not over the rete-pegs which pass below to meet the ducts of the coil-glands. Crocker, however, found lesions in both situations. Unna⁵ believes that a microorganism resembling the tubercle bacillus is responsible for the disorder, and describes the pathogenesis of the disease as follows:

"The pathogenesis of the affection may be thus surmised. In the thick, horny layer of the palm of the hand of certain individuals, definite pathophoric bacilli lead a latent existence. The increased sweating in summer or in the course of certain diseases is necessary to induce their proliferation, and this is naturally most active in the neighborhood of the sweat-pores. Here there ensues a maceration of certain basal horny cells, and then rapidly, if the part is scratched suddenly, a chemotactic setting-free of fibrinous exudation, with a few leukocytes. The organisms disperse themselves in the vesicles, which increase until the bacilli, after about a week, die; the vesicle is then encapsuled by a new horny layer, and thus one attack of cheiro-pompholyx is ended."

Unna's findings relative to the bacillus have not been confirmed by other observers.

¹ Allbutt and Rolleston's System, vol. ix, p. 667, London, 1911.

² Brit. Jour. Derm., 1891, iii, p. 303.

³ Monatshefte, 1892, xx, p. 93.

⁴ Jour. Amer. Med. Assoc., July 26, 1913, lxi, p. 240.

⁵ Histopathology, p. 179.

The histology, as described by Robinson and others, shows changes similar to those found in some varieties of eczema. There is a mild inflammatory condition of the papillary layer of the corium, evidenced by a perivascular cellular infiltration, with exudation of serum, which extends upwards into the rete, producing vesicles in the upper part. By compression, degeneration and destruction of the cells, larger vesicles and bullæ form, and no connection with the sweat-ducts is noted.

Sutton,¹ in a histological study of nine cases, found no connection between the lesions and the sweat-ducts or glands, and states that his findings correspond with those of Williams, Santi, Robinson, and others. He concludes that the 'disease is probably a neurosis, the direct exciting cause being a toxin other than locally microbic in origin.

Nestorowsky,² in an extended histological study, concludes that the disease is intimately associated with the sweat-apparatus, thus confirming the original view of Tilbury Fox. He asserts that the process originates in augmentation of the secretion of the sweat-glands, with dilatation of the excretory canal; but that dysidrosis may occur in persons whose hands never sweat, and also that in many cases of hyperidrosis there are no symptoms of dysidrosis. Briefly, the original cause is to be sought in disorders of the nervous centres, but a predisposing factor is the sweating in a hand or foot of weakened resistance. When the cause operates efficiently, the horny layer of the epidermis becomes swollen, the sudoriparous canals are blocked with horny substance, and cystic dilatations of the sweat-channels result, some of which rupture and release the effused fluid, forming vesicles in the upper, middle, and, more rarely, the lower portions of the rete. Retention of the sweat causes swelling, vacuolation, granulation, and even necrosis of the cells of the ducts and glands. Vesicles also form in the horny layer above the stratum granulosum, partly from pressure and in part from inhibition of the fluid effused. The blebs are formed by confluence of smaller lesions, coincident with which complete atrophy of the sweat-ducts and sweat-glands occurs.

Diagnosis.—Pompholyx is to be differentiated from eczema. The tendency of the vesicles to persist, and after rupture to fail to furnish a serous exudate, is strikingly different from the course of eczema. Again, there is seldom, if ever, in well-marked pompholyx, a tendency to change in type from a serous to a pustular exudation. Lastly, eczema of the palms and the soles is almost invariably of erythematous type. Pompholyx differs from pemphigus in the absence of cyclical phenomena, in its special localization, and in its frequent vesicular origin. Pompholyx is to be distinguished from the vesicular dermatitis of the hands and feet produced by the *Epidermophyton inguinale*. A microscopic examination reveals the fungus in the latter condition and settles the diagnosis (see chapter devoted to Ringworm).

¹ Loc cit.

² Zeitschrift, 1906, xiii, pp. 183, 357, 421.

Treatment.—The internal treatment of these cases is of importance. Patients require the best climatic and hygienic environment and also mental distraction. In male patients, the use of coffee, tea, and alcoholic beverages is to be interdicted. In the way of medicaments, quinin, nux vomica, arsenic, iron, the mineral acids, ergot, cod-liver oil, matzoön, and kumyss may be needed. The local treatment is by employment of diluted blackwash, lead-water, oleated lime-water with zinc oxid or bismuth subnitrate; or Lassar paste covered with boric or salicylated powder; or by the application of strips of muslin spread with lead or with zinc salves. Crocker recommends the zinc or lead oleate. In other cases solutions of silver nitrate (grains v to ʒj (0.33–30.)) or of ichthyol 50 per cent. with water are efficacious. Levisseur¹ recommends xeroform powder applied on cotton and firmly bound over each individual finger.

ACRODERMATITIS VESICULOSA TROPICA.

This is a rare cutaneous disorder described by Castellani and Chalmers² as occurring in Ceylon. These authors describe the condition as follows:

The skin of both hands, especially the fingers, appears glossy and tense, and the fingers assume a tapering shape. Millet-seed-sized or larger vesicles, deeply imbedded in the skin and having clear contents, are noted. These may remain unchanged for a long time, then slowly disappear or rupture, leaving small, superficial ulcers, which may be discrete and heal spontaneously. There is associated pain in the hands and fingers, which may be severe and continuous, or of a neuralgic, intermittent type; or there may be diffuse hyperesthesia. Itching and anesthesia have not been noted. No changes have been discovered in the nerves of the arm, and the general health of the patient is not affected. The disorder progresses for several months, occasionally for two or three years, with periods of improvement and ultimate spontaneous disappearance. The chief characteristics are the pains in the hands and fingers, the presence of deep-seated, dysidrosis-like vesicles in the glossy skin, and the long course of the disorder.

The disease is to be differentiated from dysidrosis, leprosy, dermatitis repens (Crocker), and acrodermatitis perstans (Hallopeau).

The treatment suggested is the regular application of an ichthyol ointment, 2 to 5 per cent., and the internal administration of the same drug, 3 grains three times daily.

DERMATITIS GANGRÆNOSA (SPHACELODERMA).

Gangrene of the skin may occur as the result of many causes, both internal and external. It may follow a dermatitis originally due to

¹ Loc. cit.

² Manual of Tropical Medicine, 2d Ed., p. 1621.

the action of either excessive heat or cold; it may be produced by the external application of chemical agents, such as caustics, strong acids, and alkalies; it may be due to ergot and other substances ingested; to infectious diseases, such as lepra, tuberculosis, syphilis, erysipelas; to disorders of the blood-vessels (embolism, thrombosis, acute and chronic endarteritis obliterans, arteriosclerosis); to central nervous diseases, such as Raynaud's disease; to compression of vessels by ligature, by tumors, or by inflammatory products; or to local infection by various microorganisms.

Multiple Gangrene of the Skin, due to local infection of the tissues having diminished power of resistance, may complicate typhoid fever,¹ malaria,² pneumonia,³ erythema multiforme,⁴ and other diseases. Independent of such disorders, infectious cases have been recorded by Hartzell,⁵ Wende,⁶ Waelsch,⁷ and others. In these cases the lesions were autoinoculable, presenting macular and bullous lesions, followed by gangrene, ulceration, and scar-formation. Hartzell's case followed local infection of the hand produced by injury with a meat-hook. He found both in the bullæ and gangrenous sloughs a bacillus and the *Staphylococcus aureus*. Wende's case originated from a chronic leg ulcer, and here the subsequent lesions, which were autoinoculable, were bullous and gangrenous, and in these he found streptococci, staphylococci, diplococci, and bacilli. Sailer and Bernard and Jacob report cases of gangrene due to the diphtheria bacillus. Hallopeau⁸ describes a form of gangrene in which the infection occurs on the face, especially on the forehead, as an acne-like papule, the epidermal covering of which quickly exfoliates, leaving an ulcer, which may remain superficial and disappear, leaving a scar; or may be covered with an eschar, which may persist unchanged for a long time; or the process of ulceration may extend under the eschar; or groups of new papules may develop. The same disease may affect the mucous membrane of the mouth, and the lymphatic glands may become involved.

The treatment of these cases is only moderately successful. In Hartzell's case only complete excision checked the spread of the disease. An autogenous vaccine would naturally be suggested in addition to local mildly antiseptic measures. Hallopeau recommended dusting-powders and ointments rather than wet dressings.

Single areas of gangrene have been reported in children. A local variety of gangrene has been described, under the title of *Erosive and Gangrenous Balanitis*, by Corbus and Harris⁹ and Corbus,¹⁰ in which

¹ Stahl, Amer. Jour. Med. Sci., 1900, p. 251.

² Osler, Johns Hopkins Hosp. Bull., 1900, p. 41.

³ Zuppinger, Wien. klin. Woch., No. 13, 1899.

⁴ Polland, Archiv, 1906, lxxviii, p. 247.

⁵ Amer. Jour. Med. Sci., July, 1898, p. 1.

⁶ Jour. Cut. Dis., 1906, xxiv, p. 445.

⁷ Archiv, Bd. xxxix, Heft. 2, 1897, p. 173.

⁸ Annales, 1895, s. viii, vi, p. 213.

⁹ Jour. Amer. Med. Assoc., May 8, 1909, p. 1474.

¹⁰ Ibid., June 7, 1913, p. 1769 (with résumé of foreign cases).

marked destruction of tissue may at times occur. These authors describe as the cause of the disorder a symbiosis of a vibrio and a spirochete, the latter being identical with that found in Vincent's angina. Circumcision is recommended as prophylactic, and hydrogen peroxid is stated to have a specific curative effect.

A case of extensive gangrene involving the lower abdomen, inguinal regions, and upper and inner surfaces of the thighs was recorded by Lancashire.¹ The symptoms developed here in an area the seat of chronic eczema. The case terminated fatally. The *Bacillus pyocyaneus* and the *Staphylococcus aureus* were found abundantly in the skin, less so in the spleen, liver, and kidney. The *Bacillus pyocyaneus* was also obtained from the heart's blood.

The author has seen two cases resembling the above. Both of these had extensive gangrene involving the entire side of the abdomen, extending from near the lower margin of the ribs to the groin and from near the median line in front to beyond the posterior axillary line. In one of these, a patient aged sixty-three, the lesions began in a traumatic injury from a truss; in the other, infection followed a post-operative appendicitis wound. In each the lesions were pustular and gangrenous, characterized by rapid spread and intense destruction of tissue. Much bacteriological work was done in these cases, but no unusual organisms were found.

Diabetic Gangrene occurs most frequently upon the toes and feet (though on other portions of the extremities and even elsewhere) of patients affected with glycosuria. The first lesions are usually blebs, which, after evolution, desiccate in the centre and furnish black crusts, new lesions often springing into existence at the periphery; thus producing a serpiginously spreading area with vesicular border. Either dry or moist gangrene of the affected part may result. At times extensive sloughs form, one or several digits or the whole foot falling spontaneously, or requiring removal by the expedients of surgery. The danger, however, of surgical interference in these cases is obvious. Cases are on record where gangrene of the fingers and toes has occurred in diabetic patients without the previous occurrence of blebs. We have had under observation several cases, in which there had been precedent syphilis, where pancreatic gummata were believed to exist; and also have observed symptoms of equal gravity where there was no luetic history. The association of gangrene with diabetes is believed to be due, in part, to the fact that the tissues of patients suffering from the disease last named, in consequence of weakened resistance, furnish a favorable medium for the growth of bacteria.

Treatment.—The treatment of these cases, though exceedingly unpromising, is at times rewarded with excellent results. Many cases prove fatal. Surgeons are rarely justified in amputation; but removal of dead tissue is of advantage in many cases. We have had

¹ Brit. Jour. Derm., 1910, xxii, p. 215.

the best results by careful attention to the general condition of the patient; by local asepsis; and by mummification of gangrenous tissue by continuous immersion in a solution containing 5 parts of the acetate of lead, 25 of crude alum, and 500 of water.

Symmetrical Gangrene of the Extremities (*Local Asphyxia, Raynaud's Disease*).¹—This is a paroxysmal vascular disturbance, usually affecting the extremities, characterized by local syncope, asphyxia, or gangrene.

Symptoms.—After exposure to cold, the fingers or toes, possibly only one or more, become pallid, bloodless, and the seat of intense pain. After a variable time the circulation is restored and the parts become reddened, with burning sensations. When the stage of asphyxia is reached, the parts become swollen, congested, and of a livid hue, and severe pain is experienced. Recurrences may continue for years, and usually in the winter season. Gangrene develops in a certain proportion of cases in varying degrees. Only small areas at the ends of the fingers may be involved, or extensive necrosis may occur. At this stage the congested part becomes blackish in color, cold, and insensitive, and gangrene is established. The nose, ears, and other parts of the body may be attacked.

Telangiectasia of the face and palms, and calcareous deposits in the fingers and over the extensor surfaces of the elbows, have been noted by the author. The constitutional symptoms vary with the severity of the local disturbance.

Etiology and Pathology.—This disease occurs equally in the two sexes and at all ages, and often in the cold weather of the winter season. Some cases presenting the above symptom-complex have been proven to be of syphilitic origin. The disorder has also succeeded tuberculosis, diphtheria, the exanthemata, diabetes, and hemoglobinuria. It is apparently due to trophic disturbances, the exact nature of which has not been determined.

Treatment.—Treatment is by the employment of the galvanic current, stimulation (as in dermatitis with congestion), and friction with alcoholic, camphorated, or oleaginous lotions. It is desirable to apply electricity and, in some cases, dry cupping over the spinal region. Systemic treatment should be adapted to the underlying condition in each case.

Prognosis.—The prognosis is in some cases grave. When the morbid condition is limited to a small part of the body, recovery is often satisfactory.

Dermatitis Gangrænosa Infantum.²—**Synonyms:** Multiple Disseminated Gangrene of the Skin in Infants, Varicella Gangrænosa, Pemphigus Gangrænosa, Rupia Escharotica, Gangrenous Infantile Ecthyma. Fr., Ecthyma térébrant.

¹ For bibliography, see monograph by Monro, Glasgow, 1899, and chapter by Sée, *La Pratique Derm.*, t. i, p. 436.

² Veillon and Halle, *Annales*, 1901, s. iv, ii, p. 402 (with review of the literature).

Symptoms.—As a consequence of the exanthemata (variola, varicella, rubeola, vaccinal eruptions), the head, shoulders, and trunk of some children exhibit crust-covered lesions, which ulcerate and finally throw off a gangrenous, split-pea- to small-coin-sized, deep or shallow slough, after which repair commonly occurs. Severe losses are produced by a species of coalescence of smaller ulcers.

These gangrenous points may occur beneath some previously existing lesion or crust, or they may occur on the normal skin. In most cases there forms a vesicular lesion with rosy areola, that speedily bursts, leaving a blackish slough, about which a circle of eliminating inflammation spreads. Thromboses result in the blood-vessels of the neighboring parts, edema follows, and there is excited a train of

FIG. 85



Dermatitis gangrænosa infantum.

reactive symptoms—fever, vomiting, diarrhea, albuminuria, cardiac or pulmonary troubles. The patient becomes greatly emaciated. Crocker reports hemorrhagic vesicles and bullæ in grave cases.

Brocq is careful to distinguish between these grave forms of disease and those to which should be denied the appellation dermatitis gangrænosa. In these milder forms vesicular lesions may develop, simulating those of varicella, occurring, perhaps, in crops and accompanied by a mild fever. Some among them may be covered with a blackish crust, may indurate at the base, and surround themselves with an angry zone of inflammation, and, especially about the trunk, the thighs, and the ano-genital region, ulcerate beneath the crust. Even though these ulcers coalesce and acquire a grave aspect, the result, as a rule, is not unfavorable.

In a fatal case of this disorder particularly studied by the author, vesicular and vesico-pustular lesions, which rapidly became gangrenous and sloughed, occurred over the hands, arms, lower back and buttocks, and lower limbs. The *Staphylococcus aureus* was obtained here in pure culture from unruptured bullæ, and after death from the heart's blood, by Dr. Le Count.

The subjects of this affection are infants and young children, from three months to several years of age. Beside the exanthemata which

FIG. 86



Dermatitis gangrænosa infantum. (Anthony.)

may precede, cases are on record following tuberculosis, rickets, and syphilis. The process is one which, originally dependent upon the toxic effects of specific cocci, evidently requires a special soil for its effective operation.

Treatment.—The treatment should include support of the general system, with local antisepsis by the aid of boric-acid solutions, aristol, indol, and the dressing of the parts which slough by the usual deodorizing agents.

Prognosis.—The prognosis is at times grave.

DIPHTHERIA OF THE SKIN.¹

Until recently, diphtheria of the skin referred to a secondary infection of wounds with the *Bacillus diphtheriæ*, when a false membrane was produced, in which the causative organism was found. These cases at times became extensive and fatal. In recent years numerous cases have been published showing that the organism may produce acute or chronic invasions of the skin, which clinically have no resemblance to the above. Several types of lesions are described, among which may be mentioned gangrenous patches, with severe constitutional disturbance; ulcerative lesions, with or without the development of false membranes; whitlows; and vesicular and bullous eruptions resembling pemphigus and dermatitis herpetiformis. In addition, eczematous, impetiginous, ecthymatous, and pustular types, as well as tumors and abscesses, have occurred. A description of the individual types is unnecessary, as the lesions are practically identical with those produced in the diseases to which the several types correspond.

A bacteriological examination is essential to the diagnosis. Knowles and Frescoln called particular attention to the differentiation between the Klebs-Loeffler bacillus and the pseudo-diphtheria bacillus. The disorder is contagious, and is contracted through inoculation of the organism from an infected patient; it usually occurs secondarily from the throat, nose, or larynx. It may, however, occur independently of such infection and be limited to the skin. The disorder may last for a long period of time or may be rapidly fatal.

Treatment.—In the ulcerative type, as previously noted in the chapter devoted to Gangrene, the lesions rapidly clear up upon administration of diphtheria antitoxin. This remedial agent should be used in all cases where the Klebs-Loeffler bacillus has been demonstrated. The local treatment will depend upon the character of the lesions present.

HERPES SIMPLEX.²

Synonyms.—"Fever Blisters." Fr., Dartre; Ger., Flechte, Bläschenflechte.

Definition.—Herpes simplex is an eruptive disorder, often first declared in the site of the lesions by sensations of heat and burning.

¹ Bibliography: Brit. Jour. Derm., 1908, xx, p. 239: Condensed abstracts of articles by Labbé and Demarque—Rev. Mens. des Mal. de l'Enfance, Februarv, 1905, xxii, p. 49: "Impetigo and Ecthyma Due to Bacillus Diphtheriæ;" A. B. Slater, Lancet, January 4, 1908, p. 15: "Diphtheria of the Skin of Three Years' Duration Treated by Antitoxin;" A. Eddowes, ibid., February 1, 1908, p. 284: "A Case of Severe Ecthyma from which Diphtheria Bacillus has been Isolated;" and A. Schucht, Archiv; Neisser's Festschrift, 1907, ii, p. 105: "Diphtheritic Dermatitis (Case 4, with the Clinical Picture of Infantile Ecthyma)." For complete bibliography and historical, clinical, and bacteriological description, Cf. Knowles and Frescoln, Jour. Amer. Med. Assoc., 1914, lxiii, p. 398.

² Schamberg, Jour. Amer. Med. Assoc., March 2, 1907, p. 746: "The Nature of Herpes Simplex, with a Consideration of its Diagnostic and Prognostic Significance in Various Infectious Diseases." Knowles, New York Med. Jour., August 7, 1909: "Herpes Simplex" (with references).

These are speedily followed by the occurrence of millet-seed- to coffee-bean-sized vesicles (single or relatively few in number, and in the latter case grouped), which may be preceded or accompanied by a general febrile process, though in many cases there is no constitutional disturbance. The vesicles are usually displayed symmetrically; are short-lived, surviving for but a few hours; and are filled with a clear, serous fluid, which may become lactescent. After accidental or spontaneous rupture there is left a slightly tumid, superficial excoriation, which is covered frequently by a light crust, and at times is characterized by circumscribed hyperemia, slight infiltration, or edema of the base and periphery. The lesions rarely persist for more than a few days, and leave no permanent pigmentation or scar, unless complicated by pus-infection. The subjective sensations are not usually severe; they include moderate pain, itching, and heat.

Herpes Facialis, Herpes Febrilis, Herpes Labialis, "Cold-Sores."—About the lips, the mouth, the cheeks, and the alæ of the nose, more rarely upon other portions of the face, lesions occur singly or in groups, possessing the characteristics described above. Their occurrence is usually sudden. Their frequency about the lips has suggested one of the titles under which they are most often described by authors. The tongue, the buccal membrane, the palate, and the larynx may participate in the morbid process; the lesions in such moist situations being represented by isolated or grouped, dark-grayish patches of epithelium, that are sensitive and exfoliate. The functions of the mouth in articulation and mastication are thus rendered painful. Often the lesions coalesce, forming in an irregular line of elevated epidermis a pea-sized bleb, spread along the vermillion border of the lip and distended with clear serum. The burning and itching sensations which accompany the lesions are often marked and distressing. In the course of two or three days thin crusts form, the exfoliation of which terminates the disorder. The disease is common in cerebro-spinal meningitis, acute pneumonia, and in malaria. It also occurs in scarlet fever,¹ diphtheria, and typhoid fever. In these cases, as Kaposi has shown, the occurrence of the eruption by no means augurs favorably in every instance, as, nevertheless, a fatal result may follow. The connection between labial herpes and rigors has long been recognized, though particular attention has been directed to this relation by Hutchinson and Symonds. Trophic disturbances, traumatism, exposure to solar heat, unusual fatigue, a simple coryza, exposure to a draught of cold air, and temporary gastric disorders may suffice to induce the disease. There are patients who can produce the lesions at will by tickling the lips with a feather, and in some individuals there is an exquisite susceptibility to the disease. The disorder is always short-lived, though often recurrent, and the superficial crusts which terminate the process are never followed by scars.

¹ Rolleston, *Brit. Jour. Derm.*, 1910, xxii, p. 309.

Herpes Progenitalis (*Herpes Genitalis*, *Herpes Preputialis*).—This is characterized by the appearance of one or a group of transitory vesicles, in men on the inner face of the prepuce, especially upon its upper limb, on the glans, on the balano-preputial sulcus, or in the adjacent integument; in women, on the hood of the clitoris, the labia minora, the inner face of the labia majora, or adjacent surfaces, even as far removed as the buttocks.

The disorder is seen most frequently in young adults and in early middle life, its occurrence after the age of fifty being unusual. There is commonly a precedent itching or a sensation of heat, sometimes very considerable pain, followed by the appearance of one or of several pinhead-sized vesicles seated upon a tumid and hyperemic base. Within the preputial sac the lesions may either rupture at an early moment or assume the features above described as presented upon the mucous membrane of the mouth. The resulting edema of the prepuce is often displayed in an annular tumefaction encircling the glans, while the labia minora perceptibly project from the general vulvar plane. In these localities the floors of ruptured vesicles are particularly liable to be irritated (coitus, caustic, etc.), and then pus and even blood may be exuded, with much angrier excoriation, and the resulting crusts be of darker shade. In the course of a few days even the crusts fall, and the disease is at an end. Successive crops of vesicles, however, may prolong the disorder for several weeks. Recurrence is common.

Herpes progenitalis is almost universally the result of naturally or unnaturally induced sexual erethism or of congestion of the genitals from other causes. Its occurrence in an individual without such antecedents may be due to the causes efficient in the production of herpes facialis. In unusually sensitive persons it may be associated with dyspepsia, constipation, and gout. It may follow any of the venereal diseases; or may be induced simply by filth. Though relatively rare in chaste women, it is of common occurrence in prostitutes. In some women it frequently accompanies menstruation (*Herpes Menstrualis*). The lesions, however, are not necessarily limited to the genitals, but may occur on the face, arms, buttocks, and other regions.¹

The recurrence of all varieties of herpes should be emphasized. Not infrequently the lesions reappear in the same area over long periods of time, and these areas may be conspicuous places over the face, or under the clothing in such places as the genital region, over the buttock, or other areas. Adamson² recorded recurring herpes attacking the fingers, also³ cases of recurrent herpes of the buttocks.

Epidemic Herpetic Fever.—Epidemic herpetic fever, which has been observed by Savage⁴ and others, has prevailed in institutions in which

¹ Knowles, loc. cit. Pisko, Jour. Cut. Dis., 1911, xxix, p. 240; *ibid.*, 1913, xxxi, p. 519.

² Brit. Jour. Derm., 1909, xxi, p. 323 (four cases in children).

³ *Ibid.*, 1911, xxiii, p. 322.

⁴ Jour. Cut. Dis., 183, i, p. 253.

young subjects are congregated. There are usually rigor, high fever, a coated tongue, adenopathy, and a vesicular rash on the face.

Generalized Herpes of French authors has been rarely seen in this country.

Pathology.—The eruptive phenomena are due to irritation of the nerves, either directly or through reflex excitation. Involvement of the Gasserian ganglion has been noted in several instances. Taylor¹ records five cases of involvement of the sensory ganglia supplying the areas affected with herpes. Councilman, Mallory and Wright² described acute inflammation of the Gasserian ganglion in a case of herpes complicating cerebrospinal meningitis.

Diagnosis.—The recognition of recurrent herpes about the lip or genital region is usually unattended with difficulty. An important feature in this connection is the supposed persistence of herpes labialis in certain cases, showing after a moderate length of time some induration, a little later being accompanied by marked regional adenopathy, subsequently followed by the typical exanthem of syphilis. These cases merely indicate the implantation of the *Spirochæte pallida* on an herpetic lesion. Herpes of the genital region is to be differentiated from chancroid and chancre. In chancroid, whether in the pustular form or as an inoculated abrasion, the disorder is from the beginning ulcerative in tendency, capable of autoinoculation, and often accompanied by sympathetic inflammation or virulent inguinal adenitis of one side. The induration of the initial sclerosis of syphilis is absent in herpes, unless superimposed as added infection. Balanitis, with its puriform secretion and superficial patches of reddened epithelium, or, in the severe cases, deep, destructive processes, is readily distinguished from herpes progenitalis, though the two disorders may coexist. In the examination of a case of herpes progenitalis, no assurance can be given the patient that a possible luetic infection may not subsequently develop.

Treatment.—The milder forms of herpes occurring about the lips and the genitalia require the simplest treatment. Sponging with pure water as hot as can comfortably be tolerated is often of value, if followed by the local application of a weak lead solution, spirit of camphor, or solution of zinc sulphate 1 to 6 grains (0.066–0.4) to the ounce (30.). Alcohol or spirits of camphor applied locally will sometimes abort the disease. Equal parts of tincture of benzoin, alcohol, and glycerin is an effective combination. Duhring recommends highly the following:

R—Zinc. sulphat.,				
Potass. sulphurat.,	aa	℥j-℥j;	1.33-4	M.
Alcohol.,		℥j;	4	
Aquæ dest.,		℥vij;	28	
Sig.—Shake and apply freely and frequently.				

Bleuler states that a 1 per cent. ointment of cocain gives prompt relief and shortens the course of the disease. On the lips, after rup-

¹ Amer. Jour. Med. Sci., 1903, p. 255; and *ibid.*, 1905, p. 1012.

² Massachusetts State Board of Health Reports, 1899.

ture of the vesicles, the abraded surface may be protected by frequent applications of the compound tincture of benzoin. Crusts may be removed by the use of simple ointments, to which tincture of benzoin, 1 drachm (4.) to the ounce (30.), may be added with advantage. For lesions at some distance from the mucous surfaces, dusting-powders sometimes give relief; or, if the lesions be few in number and be seen before rupture of the vesicles, the latter may be sealed completely with several layers of collodion, beneath which the lesions rapidly dry and disappear.

Occurring upon the genital region, the lesions are to be protected by the interposition of a pledget of lint, or a borated or salicylated dusting-powder. As a rule, ointments are unsuited for the moist mucous surface of the genitals, the malodorous emanations from most diseases of such parts being retained by all grease-containing compounds. Lotions answer far better, and they may be made stimulant with alcohol; astringent with tannin, zinc sulphate, or cupric sulphate; anodyne with opium or cocain; and antiseptic with formalin, phenol, or corrosive sublimate. Prophylaxis by the local use of aromatic wine, or tannin and brandy, with a sexual hygiene that will prevent congestion of the genitals, is a matter of importance. In cases in which recurrences continue, it is necessary to investigate the general health of the patient and correct whatever defects may be found. Arsenic is occasionally of value in preventing recurrences. For immediate relief, as well as for prevention of recurrences x-rays afford the best method of treatment.

HERPES ZOSTER.

Synonyms.—Shingles, Zoster, Zona, Ignis Sacer, Hemizona. Ger., Gürtelflechte, Gürtelausschlag; Fr., Zona.

Definition.—Herpes zoster¹ is an acute disorder characterized by the occurrence of groups of vesicles situated on an inflamed base, accompanied by neuralgic pains or itching sensations, of unilateral distribution, and usually not recurrent.

Symptoms.—The eruption in herpes zoster usually is preceded, for a period lasting from a few hours to days and even weeks, by hyperesthesia, itching, and neuralgic sensations of moderate or of severe intensity.² These sensations usually are limited to the area of the integument subsequently or coincidently displaying cutaneous lesions; but there are exceptions to this rule, as at times the pains are experienced elsewhere. Often, though limited to the region about to be attacked, the pain occurs where it is experienced in other neuralgias: at the points indicated by Romberg as corresponding with regions in which cutaneous branches are given off by the nerve-trunks. There may be mild constitutional disturbance in the form of malaise

¹ For bibliography, see Blaschko's article in *Mraček's Handbuch*, Bd. i, p. 677.

² Bettmann: "Pruritus als Initialerscheinung des Herpes zoster." *Deutsche med. Wochenschr.*, 1906, Nr. 19; *Cutan.*, abs. 1907, xxv, p. 43; lxxxvi.

or febrile symptoms. Adenopathy occurs frequently in the neighborhood of the eruption, and may be generalized.

The lesions of zoster, in from two to a dozen or more irregularly shaped groups, commonly are arranged along the cutaneous distribution of a single nerve. These groups are separated by areas of normal integument, show little tendency to coalesce, and may be widely scattered. Aside from the few exceptions which prove the rule, zoster occurs but once in the lifetime of an individual, and is limited to one side of the body.

According to Fabre, the essential lesion, always present even when vesicles are not seen, is the first macular efflorescence of the disease in the form of brilliant- or dull-red, poorly-defined, erythematous macules, groups of which appear in the tract supplied by the affected nerve. As the patient rarely presents himself for treatment until after the appearance of vesicles, the macules usually escape observation, either having disappeared or having been overlooked. The vesicles or vesico-papules, which are generally regarded as more characteristic of the disease, appear afterward in from a few hours to a day or more, spring from the macules or from the normal skin, and are accompanied by a sensation of heat. These typically perfect, isolated vesicles vary in size from that of a grape-seed to that of a coffee-bean. They appear in successive groups of from eight to a dozen or more, which gradually increase in size and attain maturity simultaneously in three to seven days.

The lesions, when fully developed, project well from the widely hyperemic base from which they spring, are tense from complete distention, and have no tendency to spontaneous rupture, so firm is their roof-wall. Later their early limpid contents become lactescent or puriform in character. Occasionally, they develop into blebs; and may contain pus or blood. When abundant, the vesicles may coalesce and form irregular patches. Involution is accomplished by desiccation and the formation of a yellowish-brown crust, which falls in from seven to ten days after the first appearance of the vesicle. New groups appear during a period usually of from six to twelve days, at the end of which time vesicles may be seen in all stages of development and involution. The average duration of the disease is from ten days to three weeks. Exceptionally, a succession of new lesions may prolong the disease for a month or more.

Disappearance of the vesicles and crusts is followed often by pigmentation, which may persist for weeks or months. Scarring occurs in some cases, especially if the vesicles have been ruptured and exposed to pus-infection. The scars left by zoster are characteristic. Not only are they limited to the original seat of the disease, but they have also a peculiar indented look, as if made by a nail-set and hammer. They are angular in outline, and do not exhibit the dead-white color of many cicatrices.

The pain or hyperesthesia of zoster varies greatly in intensity and in duration. It is usually mild, but may be very severe, especially

in old people. It disappears commonly with, or soon after, the appearance of the eruption, but may persist for months or even for years. Knowles¹ records marked hyperesthesia and neuralgic pains still present fourteen months after an attack of herpes zoster in a patient sixty-seven years of age.

Zoster occurs chiefly in the upper part of the body, and, though limited to one side, this limitation is rarely observed exactly at the median vertical line, as a few lesions can usually be seen extending beyond this boundary. The young subjects of the disease are usually between the thirteenth and fourteenth years of life; though children of five, eight, and ten years have been attacked.²

Atypical forms of zoster occur. The vesicles may be typical and few in number, possibly limited to a single group, or they may be abortive and transitory. Papules or vesico-papules may be the sole lesions. The vesicles may become transformed into pustules or bullæ, or be filled with blood from capillary hemorrhage, producing bluish or blackish lesions, known as *Zoster hemorrhagicus*, or "black herpes." In several cases there may be ulceration and gangrenous or deep-seated phlegmonous inflammation. Keloid-like scars occur rarely.

Recurrent zoster³ is relatively rare, but more than a score of cases are reported in which an individual had two or more attacks either in the same or in different regions of the body. In many of the cases reported, however, the recurrent lesions were not typical of true zoster. Some of these were unquestionably of traumatic origin.

Zoster of simultaneous occurrence on two sides of the body may be symmetrical or asymmetrical of development. The disease in either form is exceedingly rare. In our experience the anomaly is generally the result of herpes either in a syphilitic subject or in one under the influence of arsenic. T. C. Fox⁴ reports a symmetrical case in an infant of five months.⁵ Mobley⁶ records a case of bilateral herpes zoster occurring in the region of the left facial and posterior auricular nerves, and along the course of the intercostal nerve at the right seventh interspace.

The eruption may occur over the terminal filaments of nerves which have no communicating branches, unless, as suggested by Blaschko,⁷ there be an interlacing of fibres in the spinal cord.

In explanation of the difference in the clinical symptoms of many recorded cases of zoster, authors have attempted to distinguish between the types of the "true" disease and others produced by trauma, and by arsenical and other medicamentous ingesta. In this

¹ Jour. Cut. Dis., 1911, xxix, p. 31.

² Evans, Brit. Jour. Derm., 1905, xvii, p. 199.

³ For a résumé of the literature Cf. "Recurrent Zoster," by Joseph Grindon, Jour. Cut. Dis., 1895, xiii, p. 191. Also Vörner, Annales, 1906, s. iv, vii, p. 888.

⁴ Brit. Jour. Derm., 1898, x, p. 252.

⁵ See also Kraus, Centralb., 1905, viii, p. 226.

⁶ Jour. Amer. Med. Assoc., September 14, 1912, lix.

⁷ Monatshefte, 1898, xxvii, p. 175.

way it has been attempted to explain not merely the epidemics of the disease of the kind described by Kaposi, Lange, and others, but also the cases apparently infectious, where, as in the instances observed by Paggi, Pudor, Neisser, and others, one individual seems to have transmitted the malady to another. Thus Bärensprung, Jarisch, and others believe that idiopathic zona is a zosterian malady *sui generis*, and not to be confused with the traumatic and medicamentous types. Occasionally, in the course of an acute zoster, a generalized eruption of vesicles occurs,¹ and this with fever, hematuria, and other signs of grave systemic infection. The author² recorded a case of extensive herpes zoster involving the frontal region and scalp, in which on the fourth day there developed a generalized varicella-like eruption. A few similar cases are on record.

Anomalous nervous symptoms are: persistence of neuralgia after involution of the cutaneous lesions; neuralgia of an intense and intolerable severity at any period of the disease; painful anesthesia of the skin; paretic and paralytic phenomena, with resulting muscular atrophy; and, in zoster of the head, keratitis and iritis, complete destruction of the ocular globe, and falling of teeth and hair.

Observers are not in agreement as to the question whether the form of herpes designated as simplex and that termed zoster should be considered as one or separate affections. Of the former opinion are the thirteen authors cited by Sachs, including Bärensprung, Kobner, Neisser, Finger, and others whose names might be added. On the other side, a long list of authors might be adduced, including Hebra, Kaposi, Unna and Neumann, who hold to the total separation of the two maladies. At present facts sufficient to decide incontestibly the question are wanting. Clinically, the disorders are by most authors definitely distinguished the one from the other.³

Sachs has contributed a valuable paper on the subject of the epidemic of zoster observed in Breslau⁴ in 1901 (69 cases). He, however, recognizes no distinction between herpes simplex and herpes zoster.

According to the regions involved, the following types of zoster are generally recognized:

Zoster Capillitii.—This depends upon involvement of the second branch of the fifth pair of nerves, and its lesions occupy the anterior and posterior portions of the scalp.

Zoster Frontalis.—Zoster frontalis occurs in the area supplied by the supraorbital nerve, which springs from the first branch of the trigeminus. Its lesions extend from the upper eyelid to the vertex, and spread in a fan-shaped figure over one-half of the brow, forehead, and scalp.

Zoster Ophthalmicus.—This form may be a severe and dangerous manifestation of the disease, being often complicated by agonizing

¹ Beyer, Monatshefte, 1906, xlii, p. 415.

² Jour. Cut. Dis., 1911, xxix, p. 308.

³ See Schamberg, Archiv, 1908, lxxxix, p. 138; Jour. Amer. Med. Assoc., 1907, xlviii, p. 746.

⁴ Zeitschft. f. Heilkunde, 1906, F. 12, V. 25; Rev. Prat. d. Méd. Cut. Syph. et Vén, Nos. 1 and 2, 1907, January, pp. 9 and 219 (full bibliography to 1904).

neuralgia, formidable involvement of all parts of the eye, even resulting in panophthalmia, ulcerative keratitis, pyemia, meningitis, and death. Typical cases of zoster of this region may not, however, exhibit a single untoward symptom of the disease.¹

Zoster Facialis.—This depends upon involvement of the sensory nerve-fibres of the trigeminus distributed to the face. Its lesions are displayed over one cheek, the side of the nose, the half of the lip or of the chin. The facial and seventh nerves may chiefly be affected. Care must be taken in cases of this variety not to confound the disease upon the nose with acne or with painful tertiary syphilitic lesions; errors in diagnosis that have occurred. When the lower jaw is involved, there may be severe toothache, dysphagia, and fall of the teeth, with great resulting deformity.

Zoster Nuchæ, seu Collaris.—Zoster nuchæ occupies the region extending forward from the cervical vertebræ to the clavicle, or upward toward the occipital region and the auricle.

Zoster Brachialis.—Zoster brachialis occupies the region from the last cervical and first dorsal vertebræ over the supraspinous scapular region and the contiguous portions of the upper arm. Rarely, even the skin of the fingers and that over the first and second ribs are involved. It is a common and usually a mild form of the disease, and is characterized by a peculiar isolation of the vesicular groups. It occurs also with lesions of exclusively brachial distribution. Thomson, of London, reports brachial zoster, with involvement of the right internal cutaneous nerve, in which two groups of vesicles appeared in the palm of the hand.

Zoster Pectoralis.—Zoster pectoralis is the most frequent form of the disease, from which the common name "shingles" originated. The eruption occurs below the first dorsal vertebra, covers the skin of the thorax as far as the lumbar vertebræ, and extends from the spinal column behind to the sternal region in front. Two, three, or more of the intercostal nerves in this region are commonly involved, and the neuralgia resulting has frequently been mistaken for the pain of pleurisy. Children more often display this form than any other variety of zoster.

Zoster Abdominalis.—The area here involved extends from the lumbar vertebræ to the median line of the abdomen. Zoster abdominalis is usually much less pronounced in its features, and the exanthem is less abundant, than in the variety of the disease just described. When constipation exists, defecation may be attended with considerable pain.

Zoster Femoralis.—Zoster femoralis covers the buttocks and sacrum, and extends along the thighs, sweeping from behind forward and above downward as far as the popliteal space; in some cases involving the leg and foot. The penis, the scrotum, the labia, the

¹ Osterroht: "Herpes zoster ophthalmicus," Carl Marhold, Halle a. S., 1907; *Monatshefte*, 1907, xliv, p. 46.

vestibulum vaginae, and perianal region may then exhibit unilaterally arranged vesicles. As this is a relatively rare manifestation of the disease, the diagnostician will do well to recall the possibilities in every case of an exanthem limited to one side of the perineum, supposed to be the seat of genital eczema.

Etiology.—Herpes zoster occurs in both sexes, and in the young as well as in the old, though it is rarely seen in infants. It shows a tendency to increase in severity with the age of the patient, especially after middle life. It is influenced by the seasons, as cold and damp weather serves to increase its frequency in those susceptible to it. Frequently, there is a history of recent exposure of the involved region to a draught of cold air. Many other depressing agencies are named as effective in the production of zoster. Among them are certain poisons (carbon dioxid, belladonna, and atropin), pyemia, carcinoma, fever, measles, pulmonary inflammations (including phthisis), septicemia, hemorrhages, traumatism, malaria,¹ puerperal eclampsia,² and spinal injections.³ It also has followed vaccination, the passage of electrical currents, the extraction of teeth, an accidental prick by a thorn, the tapping of hydatids, and gunshot-wounds of the body. Curtin⁴ reports ten cases in which zoster accompanied inflammation of serous membranes. Inasmuch as no one of these causes can be cited as certainly effective in all cases, it can merely be said that any influence sufficient to induce inflammation of a sensory nerve or its ganglion may be followed by the objective signs of the disease (seventeen observations of arsenical zoster are cited by Sachs;⁵ three produced by carbonic oxid, and the others by absorption of morphia, cocain, corrosive sublimate, and antipyrin). In numerous instances zoster has followed a prolonged course of arsenic. Occasionally, zoster occurs in epidemics, or coexists with other epidemic disorders, such as influenza and varicella.⁶ The evidences of direct contagion in a few instances are very strong. These facts, and the rarity with which zoster recurs in the same individual, together with the adenopathy which is often present at the beginning of an attack, favor the growing belief that zoster is, in some instances at least, an infectious disease. Hay⁷ presents an excellent argument in favor of the infectiousness of zoster, and gives references to literature on the subject.

Pathology.—In some cases there is unmistakable evidence of a descending interstitial neuritis, but the affection may be associated with irritative action in any portion of the nervous tract from central to peripheral limit. The researches of Bärensprung, Rayer, Wagner, Charcot, Kaposi, and others have demonstrated with sufficient clearness that in zoster there are always pathological changes

¹ Winfield. *New York Med. Jour.*, 1902, lxxvi, p. 191.

² *Abst. Archiv*, 1907, lxxxiii, p. 147.

³ Pautrier and Simon, *Annales*, 1908, s. iv, ix, p. 124.

⁴ *Amer. Jour. Med. Sci.*, 1902, cxxiii, p. 264.

⁵ Corlett, *Jour. Cut. Dis.*, 1905, xxiii, p. 289.

⁷ *Ibid.*, 1898, xvi, p. 1.

⁶ *Loc. cit.*

at some point in the corresponding nervous tract (cerebral or spinal centres, ganglia, or the nerves themselves). In the majority of cases in which a pathological lesion is demonstrated, there is found an interstitial neuritis of the posterior ganglion or of the posterior spinal root; but neuritis and perineuritis of the peripheral nerves, without change in the more centrally situated parts of the nervous system, are reported by competent observers. In a number of cases multiple neuromata have been discovered along the affected nerve, the spinal cord and ganglia remaining normal. In other instances the irritation of the nerve-tract has been due to hemorrhage, degeneration, or pressure from tumors. Sunde¹ found, on microscopical examination of the Gasserian ganglion in a patient suffering with herpes zoster frontalis, active inflammation, with multiple small hemorrhages, hyperemia, and round-cell infiltration in the area around the ganglion, with round cells between some of the nerve-fibers, and a sticky, fibrino-purulent exudate. In all the sections Gram-positive cocci, mostly diplococci, but some also in small chains, were found. The ganglion on the opposite side was found to be normal.

Head and Campbell² have been able to make post-mortem examinations in twenty-one cases. They found inflammatory and secondary degenerative changes not only in the ganglia of the posterior roots, but also in the posterior roots themselves, in the root-fibers of the posterior columns, and in the peripheral nerves. Montgomery³ suggests an interesting theory to account for the coincident ganglionitis and lymphatic adenitis with the accompanying symptoms of herpes zoster: A virus (microorganism) gains entrance through some atrium (nasal or conjunctival mucous membrane) and travels along the nerve-lymphatics to the Gasserian ganglion, where it multiplies, producing the reactions that follow. Reflex irritation seems to have been an effective cause in a few cases.

According to Biesiadecki and Haight, the cutaneous lesions originate in the deeper portions of the rete, precisely as in other vesicular diseases. The exudate from the hyperemic corium, especially its papillary layer, presses upward into the rete, the epithelia of which are thus separated and vertically elongated, the lacunæ between them being distended with serum and a few round cells. Often the vesicles form about the hair-sacs. As the exudation increases, the rete-cells are progressively separated, and finally are discovered free in the exuded fluid, though some, in changed form but still united to each other, may be found in the upper part of the vesicle. Except at the margin, the mucous and horny layers are separated by the exudation. At first many-chambered, with delicate, easily ruptured partitions, the vesicle represents finally a single chamber filled with serum containing rete-cells and a few pus-cells, the latter increasing

¹ Deutsche med. Wochenschr., May 1, 1913, xxxix, No. 18, p. 849 (abstr. Jour. Cut. Dis., 1913, xxxi, p. 1047).

² Brain, 1903, xxiii, p. 362 (monograph, well illustrated).

³ Jour. Cut. Dis., 1913, xxxi, p. 156.

in number as the vesicle changes its type. Its base at first rests upon the lower portion of the mucous layer; later, upon the corium itself, in which all signs of papillæ are absent. In the vicinity of the vesicle the papillæ and corium are infiltrated and the vessels are dilated, but these inflammatory changes do not extend far into the corium. The deep location of the vesicle, resting as it does upon the papillary layer, accounts for occasional destruction of the papillæ, and consequent scarring.

The vesicle of zoster (and to a less degree that of variola and of varicella) is peculiar, in that it contains in the deeper portion and along the walls epithelial cells which have undergone transformation into round or ovoid globular bodies, usually larger than the normal cells, which have apparently a limiting membrane or double-contoured wall, and contain from two to a dozen or more rounded bodies. These transformed epithelial cells have been described as protozoa, but their true nature has been demonstrated by Unna, Gilchrist,¹ and others. Other peculiar changes in the cells are seen. Among them are rings with fragmentary edges and swollen centres (the edge representing a homogenized and fibrinously degenerated protoplasm; the centre a homogenized nucleus). Elsewhere are thin and expanded shells filled with epithelial nuclei. Irregularly "ballooning" balls, baskets, tubes, hanging cords, and other odd forms take the place of the trabeculæ found in other vesicles. Unna names this peculiar change in the epithelial cells a "ballooning degeneration," to distinguish it from the reticulating forms. Kopytowski² states that these forms are due to an edematous degeneration (views based on an examination of sixteen cases). Pollitzer³ reports an unusual case in which the vesicles were limited to the rete Malpighii of the hair-follicles.

Diagnosis.—The vesicles of herpes zoster are not rarely confounded with those of eczema; but the distinction between the two is always readily established. In eczema there is itching but no neuralgia; the vesicles tend to rupture spontaneously and never persist as they do in zoster; eczematous lesions are also smaller, more acuminate, and rarely distinctly limited to the lateral half of the body. Herpes simplex is frequently recurrent, herpes zoster rarely; herpes simplex is exceedingly likely to spread around the mucous outlets of the body, and on either side of the latter, while zoster reaches such regions only after extension from other parts, and is then almost invariably monolateral. Its lesions are, moreover, never grouped in the concentric circles of herpes iris.

Treatment.—The purpose of local treatment of herpes zoster is to protect the vesicles from rupture and infection, and to relieve pain. These ends are best accomplished by thickly dusting the lesions with an anodyne powder, such as Anderson's powder, containing morphin sulphate, 2 grains (0.133) to the ounce (30.); lycopodium

¹ Johns Hopkins Hosp. Rep., 1896, vii, p. 138.

² Archiv, 1900, liv, p. 17.

³ Jour. Cut. Dis., 1903, xxi, p. 73.

with powdered opium, orthoform, and boric acid, or zinc stearate with acetanilid. The vesicles may be punctured with an aseptic needle and the contents evacuated, but rupture of the lesions should not be permitted. Over the entire affected surface should be laid gently a sheet of soft lint or of antiseptic cotton, its meshes being also filled with the powder, and a bandage, when practicable, smoothly bound over the whole. In the milder cases nothing more than this treatment is needed from first to last. Collodion and the glycoelastins furnish a convenient and effective dressing if the contents of the vesicles be first evacuated and the surface rendered as nearly aseptic as possible. In cases in which the lesions have ruptured and their bases have undergone erosive and ulcerative changes, oleated lime-water with zinc oxid, belladonna, and opium or morphin should be applied, and be covered with Lister protective. Carbolated and anodyne ointments may also be used, especially toward the conclusion of the case. Bleuler¹ states that applications of 1 part of cocain in 50 parts each of lanolin and vaselin not only relieve the pain, but also shorten the duration of the disease.

Lotions of phenol and glycerin (1 part to 6), or lead-water and laudanum, or the "lead-and-opium wash," may be employed. Van Harlingen recommends $\frac{1}{2}$ ounce (15.) each of precipitated zinc carbonate, powdered zinc oxid, powdered starch, and glycerin, shaken up in $\frac{1}{2}$ pint (240.) of water.

Duhring speaks well of collodion with morphin, in the strength of 10 grains (0.66) to the ounce (30.). Kaposi warns against the use of diachylon ointment. Generally, it may be said that ointments should be the last resort, but those containing from 10 to 20 grains (0.66–1.33) of the aqueous extract of opium or of belladonna to the ounce (30.), or a 5 per cent. cocain salve, will at times give relief from pain. The oleate of cocain and menthol have been used locally with great advantage in meeting the same indication. Alcohol; or resorcin 2 parts, alcohol 100 parts; or 1 per cent. alcoholic solutions of menthol or of thymol, may be useful when other measures fail, and it is claimed by some that these remedies will abort the disease if used early. A continuous galvanic current of between two and three millampères may be applied over the root of the nerve two or three times daily for ten minutes at a sitting; or the high-frequency current over the nervous centre responsible for the disease; or spraying with ethyl chlorid may be employed.²

Blistering or dry-cupping, or in sthenic cases wet-cupping, may be employed instead of electricity.

No remedy for internal use is known to have the power of aborting or of shortening an attack. Acetyl salicylic acid, given in 5 grain doses four or five times daily, is of value in relieving the pain. Sodium salicylate may be used similarly, but is less valuable. Qui-

¹ *Neurologisches Centralb.*, 1899, xviii, p. 1010.

² A. Gregor-Penryn, *Brit. Med. Jour.*, 1905, xli, p. 651. Morrow, *Jour. Cut. Dis.*, 1905, xxiii, p. 157.

nin is indicated and does no harm, but quinin and strychnin in full doses have alike proved inefficacious. Other remedies employed are zinc phosphid in $\frac{1}{2}$ grain (0.022) doses, repeated every three hours, and, if indicated, in combination with $\frac{1}{2}$ (0.011) grain of the extract of nux vomica; arsenic (Kaposi); and the tonics in general. Anodynes, by mouth or by hypodermic injection, are often indispensable. Inasmuch as many patients consider the attack a trivial matter, it is of some consequence that they be warned of the possibilities of the future and that they be confined to an apartment of equable temperature, in which they are not exposed to atmospheric changes. This measure is of special importance in the zoster of the face. A skilled oculist should be consulted in cases involving the eye.

Prognosis.—Zoster usually runs a benign and self-limited course. The prognosis in exceptional cases may be in the highest degree grave. Many severe cases have occurred in which patients, after years of intense suffering, have resumed the occupations of life physical wrecks of their former selves, their faces indented with scars, and the vision of one eye impaired or ruined. Rarely the termination is fatal.

DERMATITIS HERPETIFORMIS.¹

Synonyms.—Herpes Circinatus Bullosus (E. Wilson), Herpes Gestationis (Milton, Bulkley), Pemphigus Circinatus (Rayer), Herpes Phlyctenoides (Gibert), Duhring's Disease, Hydroa Herpetiformis (Tilbury Fox). Fr., *Maladie de Duhring*, *Dermatites polymorphes douloureuses* (Brocq), *Pemphigus composé* (Devergie), *Pemphigus aigu prurigineux* (Chausit), *Pemphigus prurigineux* (Hardy).

Definition.—Dermatitis herpetiformis is a somewhat rare cutaneous affection, commonly subacute or chronic in career, at times with systemic disturbance of a mild or serious type, characterized by the production upon the skin of vesicles, pustules, blebs, or papules, often in multiform combination, usually grouped, frequently accompanied by pigmentation, producing excessive itching and burning sensations, often recurrent, and rebellious to treatment.

This is a malady which, in one form or another, and under different titles, has long been recognized and described. The credit, however, of clearly establishing its identity, and of recognizing

¹ Duhring's contributions were largely collected and published by the New Sydenham Society, London, 1893: "Selected Monographs in Dermatology." See also Bulkley, *Amer. Jour. of Obstet.*, February, 1874, vi, p. 580; Fox, *Amer. Archiv. of Derm.*, 1880, vi, p. 16; Radcliffe-Crocker, *Brit. Med. Jour.*, May 22, 1886, p. 966; Brocq, *Annales*, 1888, s. ii, ix, pp. 1, 65, 133, 209, 305, 433, and 493; Tenneson-Lyon, *ibid.*, 1888, s. ii, ix, p. 328; Stelwagon, *Jour. Cut. Dis.*, 1890, viii, p. 50; Elliot, *New York Med. Jour.*, May 28, 1892; Triboulet, *Annales*, 1892, s. iii, iii, p. 272; Fournier, *Bull. méd.*, 1892, p. 1179; Melot, *Thèse de Paris*, December 19, 1894; Leredde, *Annales*, 1895, s. iii, vi, pp. 281, 369; Perrin, *Thèse de Paris*, 1895, p. 59; Bar and Tissier, *Bull. et Mém. de la Soc. Obstetr. et Gynecol. de Paris*, February, 1895; Darier, *Annales*, 1896, s. iii, vii, p. 842; Leredde, *ibid.*, s. iii, vii, p. 846; Kromayer, *Zeitschrift*, July, 1897, p. 475; Fordyce, *Jour. Cut. Dis.*, 1897, xv, p. 495; Corlett, *Trans. Amer. Derm. Assoc.*, May 31, 1898, p. 22; *Recurrent Bullous Eruptions Limited to Certain Areas*; Jamieson, *Brit. Jour. Derm.*, 1898, x, p. 75: *Dermatitis Herpetiformis*.

one process as differently described in the several observations of others, is due to Duhring, of Philadelphia.

Symptoms.—Constitutional symptoms may be slight or wanting, but the first appearance of the disease and the succeeding attacks or exacerbations frequently are announced by malaise, sensations of chilliness, decided rigors, or alternations of sensations of heat and cold, with systemic disturbances. The skin usually is the seat of itching or of burning sensations, followed in the course of from twelve hours to two days by the appearance of the exanthem, which may be macular, papular, tubercular, vesicular, pustular, or bullous in type, very rarely purpuric; or multiform combinations of these lesions may recur in every variation. The lesions may be cutaneous, mucocutaneous, or mucous in situation, and are often disposed symmetrically.

In typical development, the disease presents vesicular symptoms of herpetic type. Flat, slightly elevated, hard, angular, irregularly outlined vesicles may appear, pinhead- to bean-sized, and tensely distended. They may be pale yellow or darker in color, and with or without areola. When bullæ form, they may be sparse or be plentiful, and be bean- to egg-sized, with cloudy, lactescent, purulent, or even hemorrhagic contents. Pustules when present are single or clustered, pinhead- to bean-sized lesions, flat, and each surrounded by a livid areola.¹ When evolution is complete, segments of rings, or distinct rings, of newly formed minute or large pustules surround those first formed, and in less than a week these rupture and become covered with a crust, which is flat, adherent, and yellowish, greenish, brownish, or blackish in color. When there is coalescence, a large-coin-sized pustule and crust may result, and even extensive patches of these coalesced lesions may form. The lesions may number from a score or fewer to hundreds. A portion or all of the cutaneous surface may be involved.

The macular form of eruption appears in small-coin- to palm-sized patches, irregularly rounded, coalescing, well- or ill-defined as to outline, and slightly raised, suggesting the lesions of erythema multiforme or urticaria. Often there are formed infiltrated areas of a vivid red hue, on which other lesions are developed. Imperfectly defined maculo-papules, papules, and papulo-tubercular lesions, varying in shape, size, and firmness, may often spring from or be intermingled with the reddish maculations described above. In one of Duhring's cases there were thumb-nail-sized, raised but flat, golden-yellow lesions, of firm consistency, containing a similarly colored, thick, consistent, gelatinous pulp. These features have been noted in other instances.

The imprint of the cutaneous symptoms is multiformity, recurrence, and variation in type from one efflorescence to another.

¹ Wende and Pease: A Case of Dermatitis Herpetiformis Illustrating an Unusual Pustular Variety of the Disease. *Jour. Cut. Dis.*, 1901, xix, p. 171.

Vesicles, pustules, and bullæ, without order or regularity of evolution or of recurrence, appear at one and the same time, in rapid or slow succession, and, without fixed intervals of appearance, for months at a time. Generally, however, prevalence of one special type of lesion may be noted during a single period of outbreak or of recurrence. This prevalence is in the direction generally of lesions of an herpetic type, viz., the vesicular and the bullous in groups, though less frequently one of the other types may predominate, and rarely vesicles may be absent. The surface may be invaded partially or generally; often only the trunk and extremities are involved.

In long-continued cases, the sites of election, according to Boeck,¹ are the extensor surfaces, about the elbows, the sacral region, about the knees, and the trochanteric and scapular regions, and with this view the author is in accord.

As a result of the conditions described above, a new formation of lesions peripherally tends to produce marginate patches, in which grouping occurs, the group, however, being interspersed with diffusely disseminated lesions of various types. The irregular, angular, or stellate forms of lesions containing fluid are highly suggestive. Pigmentation and infiltration of the skin are commonly noted. The subjective sensations of itching and burning increase or diminish as cutaneous lesions are multiplying or disappearing. The itching is in some cases more severe than in eczema, and the traumatism of scratching add greatly to the multiform features of the disease.

When the oral cavity is invaded, there appear upon the sodden and macerated mucous surface pustules and bullæ, which rupture, leaving raw and unhealthy looking erosions, even sloughing patches, of the mucous membrane. Crusts form about the nares and the lips, and the stench from the patient is intolerable. In the same way, the vulva, the anus, and the prepuce may be surrounded by vesicular and bullous lesions, which form also on the mucous surfaces adjacent and pursue a course similar to that recognized in the mouth.

The special form of dermatitis herpetiformis occurring in pregnant women (*herpes gestationis*) does not differ in its general features from the types of the disease seen in non-pregnant women and in men. The eruption, often accompanied by febrile accesses, may develop after the conclusion of pregnancy, but more often from the third to the fourth week after conception. Vesicles, blebs, papules, and macules have been observed repeatedly in successive pregnancies of the same woman, and in that subject at no other time. The lesions in these cases are exceedingly pruritic; often are developed symmetrically over large areas of the surface, usually more abundantly over the lower limbs; and may be relieved completely before the termination of gestation, or only at that period. In a few instances both death of the fetus and persistence of the disease in the mother after delivery have been reported.

¹ Monatshefte, 1907, Bd. xlv, p. 277.

arsenic in full doses acts almost as a specific; it is of most value in vesicular and bullous eruptions. It should be remembered that when arsenic is not suited to a given case large doses of the drug may do much harm. Crocker prefers salicin in 15 grain (1.) doses. Most English dermatologists prefer arsenic.¹ Sutton² advises thyroid extract in certain cases. Robinson and Whitehouse³ have had success with antipyrin.

Other existing disturbances of the general economy due to rheumatic tendencies, kidney disease, indigestion, constipation, or other cause, should be recognized and treated properly.

Locally, treatment is directed to keeping the surface clean and aseptic, and to making the patient comfortable. Duhring recommends stimulating applications when they are well tolerated, but in many cases soothing and sedative preparations are necessary. Among the stimulating applications which have proven of value may be mentioned lotions and oils containing tar, phenol (1 to 20 per cent.), ichthylol (2 to 10 per cent.); and thymol, 1 to 5 grains (0.06-0.33) to the ounce (30.). Stelwagon recommends liquor carbonis detergens in strength varying from 1 to 10 parts of water up to the pure solution. Duhring found weak sulphur ointment, 2 grains (0.13) to the ounce (30.), of value in cases in which there were vesicular, pustular, and bullous lesions. This ointment should not be rubbed in vigorously, but should be tried on a small surface at a time for fear of inducing irritation.

In most cases a soothing treatment is demanded by means of alkaline, bran, or other demulcent baths, followed by some of the dusting-powders, or the lotions advised for use in the acute stages of eczema. Ointments are not indicated, as a rule, but in a few cases diachylon ointment (Hebra), Lassar paste, and zinc, mercurial and other pastes and ointments have been used to advantage. For relief from itching, camphor and chloral (1 to 5 per cent.) in oils or ointments may be applied. Many patients are treated with very great comfort in the continuous warm water-bath.

Prognosis.—The prognosis is always doubtful, and may be at times grave. Temporary recovery from repeated outbreaks is common. Persistence for years, with periods of aggravation and decline, is the rule. Brilliant recoveries, however, occur under skillful treatment.

Impetigo Herpetiformis (*Herpes Pyemicus*).—This is a rare inflammatory affection of the skin, occurring for the most part in pregnant women, characterized by the development of smaller and larger pustules in groups, and productive of grave systemic disturbance, often terminating fatally. Hebra⁴ originally reported the disease and gave it its name, and was followed later by Kaposi⁵ with report of cases in the Vienna clinic. Scattered cases have been reported here and

¹ Brit. Jour. Derm., 1912, xxiv, pp. 148, 149.

² Amer. Jour. Med. Sci., cxl, No. 5.

⁴ Wien. klin. Wochenschrft., 1872, p. 48.

³ Jour. Cut. Dis., 1909, xxvii, p. 41.

⁵ Vierteljahr, 1887, p. 275.

there since that time, in America by Heitzmann,¹ Zeisler,² Fordyce,³ Hartzell,⁴ and Whitehouse.⁵

Symptoms.—The disease begins by the formation of groups of pin-head-sized pustules, located on an erythematous base, usually closely set, and filled with an opaque or yellowish-green fluid. The first lesions are commonly seen in the groin or on the inner surface of the thigh, with others soon following about the navel, breast, axillæ, and other parts of the body. A dirty-brownish colored crust is formed by rupture or desiccation of these lesions, and around this crust single, double or triple concentric circlets of new and similar lesions appear in succession, each series undergoing the same process of involution. The eruption thus extends until the circlets from different foci of origin unite, and extensive areas of the skin are involved.

Beneath the crusts the skin is reddened, infiltrated, smooth, and covered with new epidermis, moist as in eczema, or exhibiting a denuded corium. There is no ulceration. In the course of three or four months, the eruption is well-nigh universal, the skin being swollen, shining, and crust-covered, or seamed with excoriations surrounded by circles of pustules. Exceptionally, there are multiformity of lesions and the occurrence of the disease in women who are not pregnant. The lingual mucous membrane exhibits grayish, centrally depressed patches, well defined in contour. Alternate rigors and febrile accesses mark the periods of recrudescence when new pustules form. The physical prostration is usually grave. Delivery seems to have no favorable effect upon the course of the disease in pregnant women. Two women only of the thirteen recorded Vienna cases survived. Kaposi, Dubreuilh,⁶ Chambers,⁷ and others have reported cases occurring in male subjects.

Etiology.—The etiology of the disease is necessarily obscure, in view of the small number of reported cases. The relation between this rare disorder and dermatitis herpetiformis, herpes gestationis, and pemphigus vegetans is not determined. Many of the reported instances of the disease are not regarded as strictly assignable to the affection as first studied in Vienna. In an interesting contribution to this subject, Kren⁸ calls attention to the sharp distinction between the Hebra type of impetigo herpetiformis and the other diseases named above from which it is to be distinguished. In two cases shown by him before the Vienna Dermatological Society, a panaritium seems to have been the starting point of the septic process. In one case a panaritium formed on the left middle finger, in another a pustule on the big toe of the right foot, antedated the febrile process.

¹ Arch. of Derm., January, 1878, p. 37.

² Monatshefte, 1887, vi, p. 950.

³ Jour. Cut. Dis., 1897, xv, p. 495.

⁴ Ibid., p. 506.

⁵ Ibid., 1898, xvi, p. 169, and Twentieth Century Practice of Medicine, 1896, vol. v, p. 425 (with résumé of literature).

⁶ Annales, 1892, Tome iii, p. 50.

⁷ Brit. Jour. Derm., 1911, xxiii, p. 65.

⁸ Monatshefte, 1907, xlv, p. 297.

The disease is regarded by some as purely a pyemic process, while others believe the innervation to be at fault. Hebra was of the opinion that it was due either to a neurotic or toxic cause. Wechselmann¹ says it is possibly an autointoxication. De Amicis² considers the disease an intoxication rather than an infection. Fordyce³ regards it as the cutaneous expression of a variety of conditions.

The histology has been examined by Theodor Dumesnil and Karl Marx,⁴ Dubreuilh,⁵ and others. They found dilatation of the blood- and lymph-vessels, with surrounding embryonic cellular infiltration. These changes were most marked in the superficial portion of the corium at the base of the pustules. Cocci were present in the pustules, the latter being always within the epidermis. Interpapillary prolongations were increased in length (acanthosis). In the papillary layer below the pustule the infiltration was so active that the structure of the corium could hardly be distinguished. The cells extended into the rete, obliterating the line of demarcation between the corium and epidermis. The pustules were found at different levels in the rete mucosum.

Bacteriological examinations in these cases have been without result. At the post-mortem, evidences of nephritis, endometritis, pulmonary tuberculosis, and syphilis have been recognized in different cases.

Diagnosis.—The diagnosis of the disease is between herpes, dermatitis herpetiformis, and pemphigus.

In herpes the purely vesicular character of the lesions and the cyclical career of the disease indicate its nature. In dermatitis herpetiformis there is commonly a distinct multiformity of the lesions, and the subjects of the disease are not in such great preponderance pregnant women. There are, however, certain cases exhibiting symptoms of both disorders, and in these a differentiation cannot be made. In pemphigus the size of the bullæ and their distribution in other than concentric groups will indicate the character of the disease. Special care should be taken to distinguish impetigo herpetiformis from pemphigus vegetans. The locality primarily involved is the same in both diseases. The differentiation of the two depends upon the limitation placed upon the symptoms in the former. If bullæ and vegetating lesions could occur as accompaniments of the original pustules in impetigo herpetiformis, the differentiation would be exceedingly difficult; but if the disease were limited to the narrow confines originally described by Hebra and Kaposi, it could be readily distinguished from other disorders, and would then be found to be extraordinarily rare.

Treatment.—The treatment is conducted on general principles, including the administration of antipyretics, and the local employ-

¹ Archiv, 1910, cii, p. 207.

² Giorn. Ital., 1912, liii, No. 5, p. 711; abstr. Archiv, 1913, cxv, p. 791 (with résumé of the literature).

³ Loc. cit.

⁵ Annales, 1892, s. iii, iii, pp. 50, 353.

⁴ Archiv, 1889, xxi, p. 657.

ment of alkaline or of carbolated baths; starch and other dusting-powders; anodyne, carbolated, or simple salves; and coal-tar. A continuous bath and the water-bed are also of value. Supportive treatment should be employed when indicated. The uterus should be relieved of its contents.

Prognosis.—The prognosis is necessarily grave. Nearly one-half of those attacked perish.

PEMPHIGUS.

Synonyms.—Pompholyx. Ger., Blasenausschlag.

Definition.—Pemphigus is an acute or chronic affection of the skin, characterized by the formation of one or several well-defined, oval, rounded blebs, elevated or not above the level of the general surface, the lesions developing in successive cycles of eruption, and which may or may not be associated with general symptoms.

At one time, every dermatosis displaying blebs was accounted a form of pemphigus. With increasing knowledge, a large number of such diseases have been eliminated, until at the present time only four varieties are distinguished. It has been recognized that bullæ occur in syphilis, lepra, impetigo, and epidermolysis bullosa, and when such is the case the term pemphigus has been eliminated. Bullæ also occur in certain diseases such as multiform erythema, erysipelas, dysidrosis, hydroa æstivale, and other disorders of similar type; but on account of the association of other symptoms no confusion occurs. Certain types of dermatitis herpetiformis have been classed as pemphigus, but in the major number of instances a differentiation can be made between these disorders.

In the following description pemphigus will be treated as occurring in four forms: pemphigus acutus, pemphigus vulgaris, pemphigus foliaceus, and pemphigus vegetans.

Pemphigus Acutus (*Acute Febrile Grave Pemphigus* (Fox), *Acute Infectious Bullous Dermatitis*).—Under this title the disease will be described as it occurs following septic wounds and vaccination. The former conforms to the type described by Pernet and Bullock,¹ and later by Brocq,² under the title "*Pemphigus aigu, grave, febrile, à forme infectieuse.*" In America cases have been reported by Bowen³ and Grindon.⁴ The latter conforms to the type described by Howe.⁵ In this rare form of the disorder the course of the disease is relatively rapid, in the direction often of a grave termination or toward recovery, a few days or weeks sufficing for the cycle of manifestations.

Symptoms.—There is usually a premonitory malaise, with chills and fever, followed by the rapid efflorescence of split-pea- to small-egg-sized blebs symmetrically, and at times very generally, displayed over the body-surface. There is about many of the lesions a distinct halo. The mucous membranes, more particularly of the mouth,

¹ Brit. Jour. Derm., 1896, viii, p. 157.

² Jour. Cut. Dis., 1904, xxii, p. 253.

³ Ibid., 1903, xxi, p. 254.

⁴ La Pratique Derm., 1902, p. 761.

⁵ Ibid., 1909, xxvii, p. 439.

may be involved slightly or extensively or be spared wholly. The eruption when developing is accompanied by febrile processes. The systemic signs of grave prostration are commonly present. The eruptive phenomena may be developed in cycles or in a single rapid explosion; and the contents of the blebs may be pellucid, cloudy, purulent, or hemorrhagic. In fatal cases there are coalescence of blebs, a purulent and bloody character to their contents, and a denudation of large areas of the skin, from which the outer layers of the epidermis have been removed.

The group of cases collected by Pernet and Bullock form a type which is representative of acute pemphigus. In many of these cases the disease followed an infected wound, usually on the hand, and occurred most commonly in butchers, after bites from animals. In these cases the eruption spread rapidly and became generalized. A common symptom was the extreme fetor present in most cases. Sometimes an areola was present, but this was not constant. Hemorrhagic lesions also occurred. The mouth, palate, eyes, and nostrils were practically always affected. The constitutional symptoms were usually severe, the temperature ranging as high as 104.9° F. In some cases albuminuria was noted. Some time intervened between the wound and the development of the disorder in most cases.

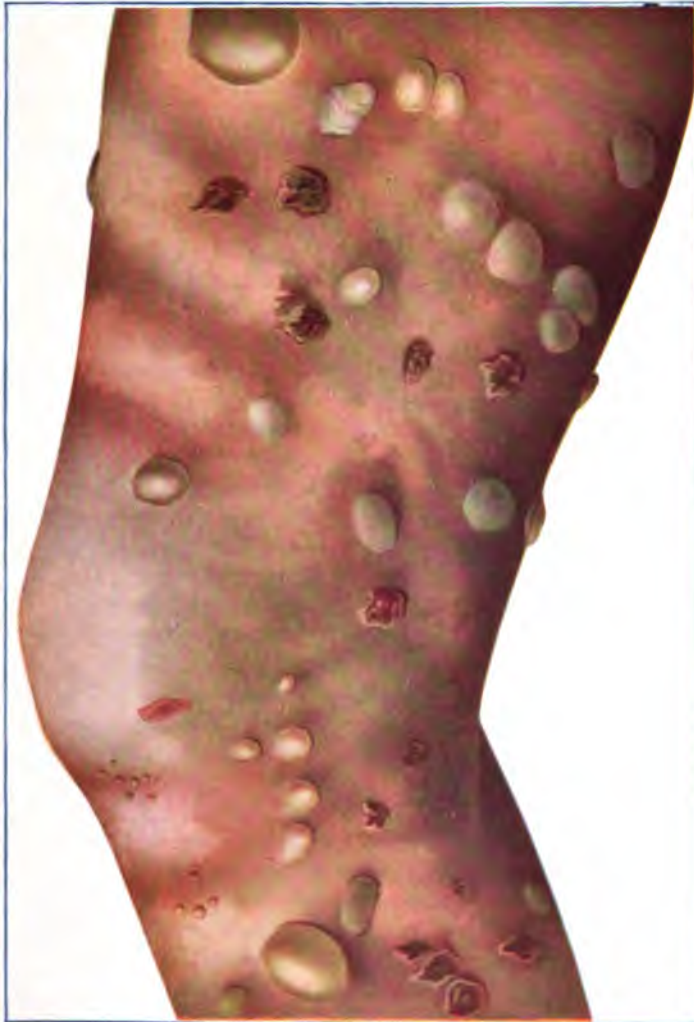
In this group Bowen¹ places the cases reported by Howe² of bullous dermatitis following vaccination. In these cases nine of the ten patients had recently been vaccinated, six died, and the average duration of the disease was six weeks from the beginning of the skin lesions until death or recovery took place. The cutaneous manifestations began about five weeks after vaccination. The lesions occurred chiefly on the back of the neck, the region between the shoulders, the axillæ, buttocks; and inner aspects of the thighs, and there was a tendency toward grouping. In most of the cases the mucous membrane of the mouth and throat was markedly affected, bullæ and ulcers being present in these situations. Corresponding lesions were also found in the trachea.

Etiology.—From the above description it may be noted that occupation is important with reference to etiology in certain cases. Most of the patients of one group were either butchers or persons who handled dead animals, and many of the patients, previous to the appearance of the disease, had had a wound on the hand where the infection had taken place. In Bowen's case the patient was a meat-cutter, and a septic wound on the hand was the beginning of the disorder. Relative to the group of cases reported by Howe, Bowen discusses the possible connection, through vaccination, of an acute pemphigus of this sort and foot-and-mouth disease of cattle, the epidemic reported by Howe having occurred immediately preceding such an epidemic. That the cases are of bacterial origin there seems to be little doubt. The definite organism has not been isolated. In

¹ Loc. cit.

² Loc. cit.

PLATE VII



Chronic Pemphigus.

the Pernet and Bullock group a special diplococcus was isolated. This organism proved pathogenic and resembled that described by Demme. Other organisms have occasionally been found, but as a rule the attempt at culture fails.

Pathology.—Acute pemphigus is induced by a toxemia, probably of bacterial origin. Hartzell¹ says: "The toxic character of the post-vaccinal eruptions and those which occur as a sequel of septic wounds is generally admitted." The histological picture shows an inflammatory process involving the superficial layers of the skin. In the Pernet and Bullock group there was well-marked cellular infiltration in the corium, extending rather deeply, and presenting the appearance of a chronic inflammatory process. There was some vascular dilatation, with perivascular cellular infiltration, the latter involving to a certain extent the sweat-glands. In the epidermis the bullæ were found between the stratum corneum and the rete. The bullæ contained a fibrinous network, throughout which were entangled cells of the rete. In addition, they contained small, round cells, with large, deeply-stained nuclei, a few red-blood corpuscles, and some micrococci.

Treatment.—The treatment resolves itself into two factors, the first prophylactic, which is the more important. Immediate attention to wounds suffered by butchers and other people working with animals should be urged and thoroughly carried out. When the disease is well started, the general treatment suggested by the patient's condition should be instituted. Quinin in large doses; vaccine, if an organism can be isolated; and supportive treatment are indicated. Locally, the continuous bath would be of value, and soothing and emollient preparations should be employed for the comfort of the patient. Close attention should be paid to cleansing of the skin in order to prevent absorption from secondary infection. Pernet² reported the successful management of a case of acute septic pemphigus, developing upon dermatitis herpetiformis, with opium and liquor arsenicalis.

Prognosis.—From the above, it will be seen that the prognosis is very grave, on account of the high rate of mortality.

Pemphigus Vulgaris (*Pemphigus Chronicus*, *True Pemphigus*).—The term *Pemphigus vulgaris* is applied to the more common clinical forms of the disease, and it has been employed generically by many authors to include all varieties of the malady. The title *Pemphigus diutinus* has been used also to designate that form of eruption in which the characteristic lesions follow each other with rapidity and in profusion, fresh bullæ occurring each day. Fortunately, all forms of the disease are relatively rare.

Symptoms.—The cutaneous lesions in pemphigus vulgaris are often preceded by febrile symptoms; and the disturbance of the economy is declared in cardiac, respiratory, and gastro-intestinal derange-

¹ Jour. Cut. Dis., 1912, xxx, p. 119.

² Brit. Jour. Derm., 1910, xxii, p. 1.

ments of function. The fever may be continuous, remittent or intermittent, and is usually aggravated just before the appearance of a fresh crop of blebs.

The face, the trunk, and the extremities are chiefly involved. The eruption occurs by the successive appearance of bullæ of varying sizes. As a rule, they appear upon what seems to be normal skin, and have no areola. If the latter is present, it is commonly narrow and is evident only after the full development of the bleb. The individual lesions may persist for days, or may rupture at an earlier period, leaving behind a superficial excoriation, which after healing exhibits pigment. The bullæ are tense, well-rounded or oval, but occasionally they may be flaccid, the roof partially collapsed upon the serous, purulent or bloody contents. Following these the crusts which form are rather bulky. The bullæ occur in all sizes, from that of a pea to that of an orange, and invade not only the skin, but also the mucous membrane of the mouth and vagina. The eruption is rarely generalized, and throughout the course of the disease not more than half a dozen lesions may at any time be visible upon the surface of the skin. Their contents may be removed by evaporation, absorption, or rupture, leaving a crust, the color of which is largely determined by the contents of the bleb. The lesions may coalesce and produce large areas, and, whether ruptured or not, the involution is accompanied by desiccation and crusting; the crusts being usually found to contain blood, pus, epithelial débris, and the exudate from the base of the bleb. Beneath such a crust there forms a new epidermis, which is usually violet, purplish, or bluish-red in color, and which later displays a brownish pigmentation, which may survive the disease for several weeks. The evolution and involution of a single lesion may be accomplished within a few days, but the disease may be prolonged by successive eruptions for weeks or months.

Occasionally, the affection occurs with very mild and even insignificant phenomena (*Pemphigus benignus*). There may be no fever and very few blebs may appear; in some cases but a single lesion can be seen (*Pemphigus solitarius*). In other instances the fever is intense; the eruption abundant; the skin edematous, painful, itching, and excoriated; and the underlying lymphatic glands enlarged. This general condition, with exacerbations and remissions, may persist for months, and the eruption may then disappear never to return, or to recur, as it often does, in the future. The intercurrent disorders of the disease may be numerous, and death occurs from septicemia, exhaustion, and lymphangitis, the neighboring vessels and glands exhibiting evidence of the infection produced by the secondary invading organisms.

Pemphigus disseminatus, *Pemphigus circinatus*, and *Pemphigus hemorrhagicus* are terms that have been used in describing phases of the disease. *Pemphigus malignus* is a term which has been applied to those cases ending fatally, which somewhat resemble the acute form described here.

A case representing this type was reported by the author, conjointly with Dr. Bassoe.¹ This case, in which the lesions originated in the mouth, terminated fatally in two months. Extensive cutaneous involvement occurred, with the formation of bullæ and severe and extensive erosions of the skin. Neither vaccination nor a wound preceded in this case. Two others have been seen by us during the past few months, each ending fatally in a short time, the lesions beginning in the mouth, with subsequent widespread dissemination of bullous lesions on the cutaneous surface.

Etiology.—The theories held in the past as to the origin of the disease have been the neuropathic, the toxic, and the infectious.

Pemphigus is reported as of more frequent occurrence in males in Europe, but in this country the reverse seems to be true. It is often observed in debilitated patients, who are suffering from nervous prostration, worry and exhaustion, neurasthenia, general debility, visceral disorders, and impairment of nutrition.² It is not inherited. The states in which there is marked impairment of bodily vigor are particularly favorable to the development of the disease. It may occur with neurotic affections, but the etiological relation which these bear to the malady is undetermined. We have observed one case of the disease in an adult in whom pemphigus of typical appearance occurred after mental depression, which was so greatly increased after the appearance of the exanthem as to lead to suicide.

The neuropathic origin is held by many, but the proof in most cases is lacking. Occasionally, there seems to be a connection between the disease and changes in the trophic nerves and nervous centres. It is well known that traumatism and lesions of the cord have been followed by bullous efflorescence upon the body-surface. But, as Kaposi has well shown, on the one hand blebs from these demonstrable causes do not constitute pemphigus in the clinical sense; and, on the other hand, there is no uniformity among lesions, either as to anatomical sites or other features, in the spinal changes to be recognized in pemphigus with a fatal issue. The view, therefore, seems to be gaining ground that the disease is of toxic origin, but the nature of this is yet to be explained.

Hartzell³ believes that the pathogenesis of other varieties of pemphigus is similar, and that they also are toxic in origin. Johnston⁴ favored a toxemia of metabolic endogenous origin.

From the standpoint of infection, a number of organisms have been brought forward, but in view of the fact that the bullæ when formed are usually sterile no definite results have been obtained. Secondary infection with staphylococci commonly occurs. The *Bacillus pyocyaneus* has been isolated from this, as well as from other types of

¹ Jour. Cut. Dis., 1905, xxiii, p. 294.

² Vollmer, E., Zeitschrift, 1901, viii, p. 138; White, C. J., Boston Med. and Surg. Jour., 1903, cxlix, p. 297.

³ Jour. Cut. Dis., 1910, xxviii, p. 111.

⁴ Brit. Med. Jour., October 6, 1906, p. 839.

pemphigus. Petges and Bichelonne¹ obtained the *Bacillus pyocyaneus* in pure culture from the blood before, and the heart's blood after, death in a case of chronic pemphigus.

Max Joseph² states that certain cases of pemphigus begin with infection occurring in the gums after the extraction of a tooth. In our case above mentioned, the disease apparently followed a treatment of the gums. Other similar cases are reported.

Lipschütz³ describes organisms which he found in cases of chronic pemphigus, which he believes are connected etiologically with the disease. The first, a small organism termed *Cytoplasma oviforme*, which measures from 1.5 to 2.7 microns, is egg-shaped, and has an eccentric nucleus, extending through the margin of the cytoplasm or just bordering the periphery, giving it a signet-ring shape. This organism appears to have a cyclic existence. A second and smaller one he termed *Anaplasma liberum*. This occurs extracellularly and has practically no cytoplasm, being made up of chromatin or nuclear substance. Lipschütz also found these organisms in cases of dermatitis herpetiformis.

Pathology.—Great divergence of opinion has existed as to the location of the bullous lesion in pemphigus. It has been described as occurring immediately beneath the stratum corneum, at various depths in the rete, and between the epidermis and corium. That it may occur in all these places seems to be proven.

The contents of the bullæ consist of a fluid of similar character to that of the blood-serum, in which fibrin-forming bands occur with leukocytes, both polynuclear and eosinophiles, in various stages of degeneration, together with epithelial nuclei and débris of epithelial cells. Gilchrist⁴ describes a section from a bullous lesion as follows: "The contents of the bleb consist of fibrin, coagulated albumin, a few lymphoid cells, numerous polynuclear leukocytes, and a few epithelial cells. The papillary layer of the corium shows the presence of acute inflammatory changes, together with marked serous exudation, particularly around the vessels. The uncovered papillæ form the base of the bleb. The reticular portion of the corium is normal."

In the histology of the lesions studied by the author in a comparatively acute, fatal case, the ulceration was found extending through the epidermis. In the corium the vessels were dilated and filled with red-cells. Throughout the corium were mast- and round-cells of varying appearance. Masses of staphylococci were noted in the infiltration. The deeper layer of the corium was less involved and the subcutaneous tissue free.

Diagnosis.—Pemphigus is to be differentiated from other bullous disorders. In the bullæ of lepra there is usually coexisting cutaneous

¹ Annales, July, 1908, p. 417.

² Archiv, 1911, cx, p. 399; abstr. Jour. Cut. Dis., 1912, xxx, p. 222.

³ Ibid., 1912, cxi, p. 675; abstr. Jour. Cut. Dis., 1913, xxxi, p. 183.

⁴ Dühring's Cutaneous Medicine, Part 2, p. 461.

anesthesia, and the involution of the bleb is followed by a strikingly characteristic atrophic patch, usually pigmented and insensitive.

No difficulty should be experienced in differentiating this form of pemphigus from the bullous syphiloderm. The latter occurs only in infants, in hereditary lues, and is usually limited to the palms and soles.

From bullous impetigo, particularly that variety formerly classed as pemphigus neonatorum, it is distinguished by the history of contagion and the autoinoculability of the lesions in impetigo.

No difficulty will be found in differentiating pemphigus from such diseases as erysipelas, dysidrosis, hydroa aestivale, and other such disorders, when the associated symptoms of these diseases are recognized. The greatest difficulty arises, however, in the differentiation between certain cases of erythema multiforme and dermatitis herpetiformis and pemphigus. In fact, there are certain cases that cannot, even after prolonged study, be positively placed in any one of the categories. As a rule, in dermatitis herpetiformis, the lesions are more multiform, vesicles, pustules, and other lesions being present at some time or other during the course of the disease. From multiform erythema pemphigus usually is readily distinguished by the peculiar characteristics of the former. In certain bullous varieties of multiform erythema, however, the resemblance is close, and, indeed, at times a differential diagnosis is impossible.

From herpes iris, a subdivision of multiform erythema, it is distinguished by the lesions of the latter being more vesicular than bullous and more transitory. They are concentrically arranged, vary in color, and are situated more frequently upon the extremities, especially the backs of the hands.

Finally, some ingested medicaments are capable of producing bullous lesions; for example, potassium iodid. Such a possibility should always be borne in mind when establishing a differential diagnosis. In rare instances, scabies in infants and older children, when characterized by the formation of blebs, might cause confusion, but a history of contagion, the discovery of the parasite, and the location of the lesions will point to the real nature of the disease.

The external application of cantharides, mezereon, the stronger acids, alkalies, and other chemicals may be followed by blebs produced either by accident or by intention, with a view to feigning disease. The intentional production of such symptoms is usually effected upon the anterior faces of the lower extremities, regions within easy reach of the right hand, and the lesions produced are readily distinguished from true pemphigus.

Treatment.—The internal treatment of pemphigus is a matter of importance, as will be suggested by even a brief consideration of the constitutional states in which it occurs. Hutchinson¹ believed that "arsenic is a specific for the state of health upon which relapsing pem-

¹ Lectures on Clinical Research, London, J. and A. Churchill, 1878, p. 49.

phigus depends." It is still employed to a large extent by English physicians. Kaposi declared that he had been unable to obtain favorable results from its employment. Iron, quinin, ergot, strychnia, and the mineral acids are indicated in many cases, in conjunction with a nutritious diet. Cod-liver oil and the malt preparations on the market should not be neglected. Salicin (Crocker), 15 grains (1.) three times daily in water, has been found useful. Cassâet and Micheleau¹ report curative results in the treatment of pemphigus by exclusion of salt from the dietary. Leszczynski,² Kyrle,³ and others report improvement with intravenous injections of quinin. Leszczynski reports that in two cases out of three the lesions were cleared up, and in the third the patient was rapidly improving.

Strümphe⁴ reports favorable results in two cases from treatment with intravenous injections of salvarsan.

The local treatment includes the opening of large bullæ and their subsequent dressing with equal parts of olive oil and limewater; an ointment containing equal parts of Hebra's diachylon ointment and the official oxid of zinc ointment; 25 parts of cornstarch, 25 parts powdered zinc oxid and 50 parts of naftalan; or a simple ointment containing boric acid. A simple dusting-powder, such as those recommended in eczema, may be used at a later period. In severe cases, a continuous water-bath may be employed for some hours each day, employing in the interim some one of the above-mentioned preparations.

Pemphigus Foliaceus.—Pemphigus foliaceus is a rare form of the disease, which may originate in one of the common dermatoses or in a grave form of pemphigus vulgaris, or may at the onset present characteristic features. Hallopeau and Fournier,⁵ Low,⁶ Biddle,⁷ and others have reported cases which began as a dermatitis herpetiformis.

Symptoms.—The lesions are flaccid bullæ, which are developed without a perceptible preëxisting exanthem, and which speedily rupture and discharge their ill-conditioned contents, leaving beneath an excoriated, reddish or purplish, and at times inflammatory, surface. Often the blebs are defined so poorly that the epidermis seems scarcely raised from the tissue beneath, the condition resembling that of the skin to which a blister has been applied with the result of imperfect vesication. The contents, at first pellucid or lactescent, become later purulent or sanguinolent. Occasionally, successive blebs form in the same area, producing many layers, the condition resembling an exfoliative dermatitis.

When rupture of the blebs occurs, there form yellowish-brown

¹ Archiv gén. de Méd., January 16, 1906.

² Archiv, 1912, cxiv, p. 129, and cxviii, p. 633; abstr. Brit. Jour. Derm., 1912, xxiv, p. 447.

³ Archiv, 1913, cxv, p. 636.

⁴ Berlin. klin. Wochenschrift, July 1, 1912, xlix, No. 27, p. 1267; abstr. Jour. Cut. Dis., 1912, xxx, p. 626.

⁵ Bull. Soc. franc. de Derm. et de Syph., 1892, p. 470.

⁶ Brit. Jour. Derm., 1909, xxi, pp. 101 and 135 (full bibliography).

⁷ Jour. Cut. Dis., 1897, xv, p. 203.

crusts, which acquire a feeble attachment to the centre of the floor of the original chamber, while their edges remain free. These edges, visible over the affected surface in polycyclical or irregular outlines, incompletely hiding the raw and sodden epidermis, present a characteristic picture. The crusts have often been likened to flaky pie-crust. In this variety Nikolsky's sign is characteristic. This is the ready removal of the skin following the slightest injury, or, as has been stated, the skin may be brushed off with little effort.

The disease spreads gradually until it becomes symmetrical and universal, a peculiarity which distinguishes it from other varieties of pemphigus. As the disorder advances, the patient lies in a pitifully helpless condition, the remaining epidermis being completely undermined by the serum exuded, in places exposing large areas denuded of skin and in a condition of inflammation of a low grade. Even, however, when the disease is fully generalized, the appetite and bowel function are at times unimpaired.

In its later stages, after it has become generalized, the pemphigoid origin of the disease is not always easy of demonstration. In these instances large masses of greasy scales are exfoliated from the surface, the moisture exuding from which is scarcely sufficient to attract attention. The odor from the body becomes offensive; fissures form in the infiltrated skin; the facies of the patient may become as repulsive as in some forms of lupus or variola; the swollen hands, with distorted nails and contracted fingers, resemble claws.

The disease affects the mouth and throat, denuding the mucous surfaces of the epithelium. The scalp becomes affected along with portions of the body. The hairs remain attached for a long time, but eventually they are completely swept away. Over the face, at first merely reddened and scaling, occur retractive processes, which at times produce ectropion and consequent conjunctivitis. Over the body, especially at points pressed upon when reclining, profound ulcerations may destroy the deep skin. The palms and soles are infiltrated and fissured rather than the seat of much exudation. The nails are commonly furrowed and distorted; occasionally, they are shed. The subjective sensations are those of burning, smarting, and soreness, rather than of itching. If the patient be kept in the continuous water-bath, though the disease is not thereby ended, the comfort of the sufferer is admirably secured.

There may be no fever or there may be a rise of body-temperature, with recurrence of lesions, which, in a late stage of the disease, appear in the sites of those which have been followed by imperfect attempts at repair, a thin and glazed epidermis forming, in cases of chronic type, in the sites of former bullæ. In other cases the temperature remains above normal for weeks at a time, especially in advanced stages of the disease. The malady may complete its course in a few months or may persist for years. Adamson¹ recorded a case

¹ Brit. Jour. Derm., 1910, xxii, p. 381.

of sixteen years' duration. Death usually results from exhaustion; occasionally, an intercurrent pneumonia or diarrhea concludes the history.

Pemphigus foliaceus commonly attacks adults, but Brand¹ reports the occurrence of the disease in a newborn child.

Etiology.—The disease may be such from the beginning, or may develop on a dermatitis herpetiformis or a chronic pemphigus. In certain cases a mental or physical shock has preceded the disorder. It has developed during the course of pregnancy (Hardaway). Leredde considers it a blood-disease due to the action of some toxic substance on the blood-forming organs, particularly the bone-marrow. The toxic theory, which is the one accepted by most observers, covers a comparatively large field. The toxins may be produced either with or without the aid of microorganisms, and to a certain extent the nervous system is associated with such changes. Hartzell,² Low,³ and many others record their opinion in favor of the toxic theory.

The neuropathic theory, as in other varieties of pemphigus, stands first in the estimation of many. In repeated examinations, no gross changes have been found in the nervous system.

The parasitic theory has several supporters. Hazen⁴ attributes the disease to the *Bacillus pyocyaneus*, which he found in the blood, urine, and vesicles of the cutaneous surface in a patient suffering with pemphigus foliaceus. The same author⁵ concludes that some cases of pemphigus foliaceus are undoubtedly due to the *Bacillus pyocyaneus*, and that general infection and death may take place from the same organism. Low,⁶ after investigating the microbic theory, believes that it cannot be substantiated, but after an extensive study concludes that the disease is toxic.

DuMesnil de Rochemont⁷ reported a case of typical pemphigus foliaceus following a whitlow produced by a thorn, which subsequently led to infection of the arm, with lymphangitis and suppuration.

Pathology.—The histology of this disease has been well described by Unna,⁸ Nikolsky, Leredde,⁹ Gilchrist,¹⁰ and others. In the corium great vascular dilatation is present, both in the papillary and deeper layers. The lymphatic vessels and spaces, especially the former, also show dilatation. There is a cellular infiltration, composed of lymphocytes, polymorphonuclear leukocytes, and a few eosinophiles. Leredde and Fabry noted pigment-cells and free pigment, also some deeply situated mast-cells. Leredde found many eosinophiles in the dilated vessels of the papillæ. In the epidermis the rete-pegs

¹ Brit. Med. Jour., June 7, 1902.

² Loc. cit.

³ Ibid., 1912, xxx, p. 325.

⁴ Archiv, 1895, xxx, p. 163.

⁵ Histopathology, Walker's Translation, 1896, p. 174.

⁶ Annales, 1899, p. 601.

⁷ Duhring's Cutaneous Medicine, Part 2, p. 463.

⁸ Loc. cit.

⁹ Jour. Cut. Dis., 1910, xxviii, p. 118.

¹⁰ Loc. cit.

are greatly elongated and the epithelial cells over the papillæ are thin. In these situations the horny layer lies close to the edematous papillæ, which are naturally elongated to correspond with the interposed rete-pegs. The epithelial cells show edema, the prickles often being destroyed and the individual cells separated by spaces, with occasional microscopic vesicle-formation. Migratory cells are found interspersed. The bullous formation occurs at different levels, and has been described as occurring all the way from between the epidermis and the corium to just below the stratum corneum. Gilchrist's description of an early lesion is important. In this case the bleb was situated in the rete, and contained coagulated serum, fibrin, and numerous polynuclear leukocytes, many of which were seen migrating through the basal epidermis. The interepithelial spaces were enlarged, and the corium showed acute inflammatory changes, indicated by vascular dilatation and perivascular infiltration of polynuclear leukocytes and lymphoid cells. The papillæ beneath the bleb were flat.

The blood changes described are variable. Eosinophiles have been found increased in a number of cases, but in many others no increase was noted. Leredde¹ has chiefly emphasized this point. Schalek² noted a moderate eosinophilia in his case.

Diagnosis.—The disease is to be differentiated chiefly from dermatitis exfoliativa. As certain cases develop into a general exfoliating stage, the differentiation is difficult. The presence of flaccid bullæ or a history of such, the moist or oozing surfaces, the crust-formation, and the peculiar odor exhaled by the patient are important in diagnosis. Dermatitis exfoliativa is a dry, scaling disorder, as a rule. Nikolsky's sign (the stripping of the epidermis) is usually present. Jamieson's³ statement that pemphigus foliaceus presents the appearance of a general exfoliative dermatitis with pemphigus implanted is very apt in many cases.

The disease also must be differentiated from a generalized eczema. The authors have seen a case of true pemphigus foliaceus diagnosed as eczema. The large crusts, peculiar odor, and presence of flaccid bullæ are usually sufficient to distinguish the two. However, some observation may be necessary in certain cases to determine the above characteristics.

The disease must also be differentiated from certain cases of chronic pemphigus and dermatitis herpetiformis, but by recalling the essential symptoms of these disorders the diagnosis can usually be made, though at times pemphigus foliaceus is a sequel to these maladies.

Treatment.—A water-bed is advisable, and at times a continuous water-bath. Careful cleansing of the skin is necessary. Arsenic and quinin may be tried, but as a rule they are of no value. Autogenous vaccine also should be used, as it has proven of some value.

¹ Loc. cit.

² Jour. Amer. Med. Assoc., July 2, 1910, p. 4.

³ Diseases of the Skin, 4th ed., 1894, p. 345.

Owing to the great chance for absorption, the local treatment must be carefully watched and only the blandest and non-toxic applications made. Oleated lime-water, plain unguentum aquæ rosæ, and simple dusting-powders are suggested. Caution is advised with the latter, however, as they tend to dry and form crusts, beneath which infection may spread. The alternate use of a continuous bath, if available, for one or two days at a time, followed by a dusting-powder of simple borated talcum or a mild boric-acid ointment, keeps the skin clean and the patient more comfortable than other methods.

Prognosis.—The disease, as a rule, terminates fatally, hence any treatment is only palliative.

Pemphigus Vegetans (*Erythema Bullosum Vegetans*, *Herpes Vegetans*, *Condylomatosis*, *Pemphigoides Maligna*).—Neumann,¹ in 1886, was first to describe and furnish illustrations in color of a disease to which he gave this name, and which has since been studied by a number of observers. Crocker, of London, published an excellent monograph, giving tabulated results in some eighteen cases, and Dr. Hyde² published a report of the first case recorded as such in the United States. Winfield,³ in 1907, reported a typical case, and in a review of the literature records fifty-eight authentic cases up to that date.

Symptoms.—The onset of the disease may be marked by languor, malaise, febrile symptoms of moderate severity, and ill-defined symptoms of impaired health, after which the morbid phenomena may be declared in the mouth or in the skin; or the first manifestation of the disease may be the mucous-membrane or cutaneous lesions accompanied by other symptoms. In the mouth, white patches, which are ill-developed blebs and exhale an unpleasant odor, are visible upon the mucous surface. The detached membrane forming each spot finally is loosened and leaves behind equal-sized, excoriated patches, which produce extreme soreness of the mouth, and which as some heal are succeeded by others. In severe cases they render mastication and deglutition painful; and in patients in whom this becomes a prominent feature of the case the nutrition of the body as a consequence is seriously impaired.

The skin-lesions may precede or follow those in the mouth. They commonly are seen in women first about the vulva, spreading over the ano-genital region and umbilicus as closely-set bullæ, covered with a mucoid, whitish secretion, the features thus strongly resembling the appearance of condylomata of the same region. In connection with the mouth lesions, the suggestion that syphilis is present is very striking, and has led to this error of diagnosis in a large number of instances reported by those not expert in diagnosis. In other cases the scalp, hands, feet, axillæ, and other parts are involved primarily. Pollitzer⁴ reported a case, which proved fatal in six months.

¹ Vierteljahr, 1886, Bd. xiii.

² Jour. Cut. Dis., 1891, ix, p. 412.

³ Ibid., 1907, xxv, pp. 17 and 71.

⁴ Festschrift zur Vierzigjährigen Stiftungsfeier des Deutschen Hospitals, New York, 546; abstr. Brit. Jour. Derm., 1911, xxiii, p. 335.

in which the disease began as a condylomatous lesion about the anus. Wilfrid Fox¹ fully describes a case in which the lesion began upon the neck.

The bullous or vesico-bullous efflorescences, which at first resemble those of other forms of pemphigus, speedily exhibit at the site of their production excavations, ulcerations, or, more commonly, vegetating masses, the change from the bleb to a fungoid, papillomatous growth being scarcely appreciable. Botelli² describes the evolution of the lesions as follows: First, a bulla, tense if clear, flaccid if purulent, that ruptures instead of healing. Papillomatous granulations spring up, which discharge a fetid, purulent liquid. The vegetations become covered with a brownish-yellow crust, are well defined and are surrounded by a red halo.

The lesions may coalesce and tend to become grouped about the axilla, the circle at the root of the neck, the bend of the elbow, the hand, the foot, and the scalp; but they have no tendency to become universal, even when extensive. The nails may become affected, as the result of the formation of blebs in the matrix. A singular change in the skin, where typical well-formed bullæ have developed and healed, is a deep pigmentation, in puncta resembling comedones, with pin-point-sized verrucoid elevations of the surface. In some regions the sequence of the closely packed blebs, followed by vegetating masses, resembles that seen in pemphigus foliaceus, in which, especially over the back after long decubitus, there form large, granulating erosions, exquisitely painful and conducive to a rapidly fatal issue. Indelible scarring may result.

The disease progresses in unmistakable accessions of aggravation and improvement, lasting for months and occasionally for years. It is in the large majority of cases eventually fatal. Variations occur, chiefly in the degree of febrile temperature, probably always reactive; in the severity of the buccal lesions; and in the extent of the eruption.

In the case reported by Zumbusch³ nut-sized and larger tumors developed from the papillary excrescences.

A survey of all reported cases emphasizes the view taken by Dubreuilh, Tommasoli, and Winfield, that the cases described by the various authors represent two widely different types. In the true pemphigus vegetans of Neumann, which is probably invariably fatal, lesions of grave significance develop beneath the first-formed blebs. A second group includes the cases in which a few recoveries have been reported, where the bullæ of chronic pemphigus have been complicated by vegetations springing from the seat of bullous lesions, or where vegetating lesions have developed in the course of an attack of dermatitis herpetiformis. Constantin,⁴ in reporting a case of pem-

¹ Brit. Jour. Derm., 1908, xx, p. 151.

² Giorn. ital. d. Mal. Ven. e della Pelle, lili, p. 495; abstr. Brit. Jour. Derm., 1911, xxiii, p. 370.

³ Archiv. 1905, lxxiii, p. 121.

⁴ Annales, 1907, p. 641; abstr. Brit. Jour. Derm., 1908, xx, p. 204.

phigus vegetans developing upon dermatitis herpetiformis, ventures the opinion that benign pemphigus vegetans is really dermatitis herpetiformis with vegetations.

Etiology.—The cause of the disease has not been demonstrated. A number of bacteria have been isolated, the chief among which are the following: Winfield¹ isolated in pure culture *Bacillus pyocyaneus* and *Streptococcus pyogenes aureus*, and was inclined to place some significance on the finding of the first of these two organisms. He further reports from the literature the finding of *Staphylococcus pyogenes aureus* by Marinelli; a coccus by De Michele; a small bacillus and the streptococcus by Gastou; a diplococcus by Philippson and Fileti; a pseudo-diphtheritic bacillus by Waelsch; *Staphylococcus aureus* by Hamburger and Rubel; a bacillus and a coccus by Cheeseman (in Dr. Hyde's case); the pseudo-diphtheritic bacillus by Stanziale; and *Bacillus pyocyaneus* and *Bacillus coli communis* by Pernet. In some of the above instances, the organisms described have been found not only in lesions but in the blood; but as yet the findings are too widely diversified for one to arrive at conclusions.

The neuropathic theory is also brought into account in these cases. In the case of a young woman in our charge who succumbed to pemphigus vegetans, the remote cause of the disease was a nervous shock consequent upon rape.

Pathology.—The pathogenesis is not understood, but the disease is best explained by a toxemia of bacterial or other origin. The histology has to be considered from different standpoints: first, as it is found in the early bullous lesion; and, secondly, in the vegetating masses. Weidenfeld, in an exhaustive study of the histology of the disease, calls attention to the enormous dilatation of lymph-vessels always present, together with a more or less extensive perivascular cellular infiltration, edema of the papillary layer of the cutis, changes in the elastic-tissue fibers, and edema in whole or in part of the rete. He believes the dilatation of the vessels to be idiopathic, and thinks there may be a circulating substance in the blood-serum doing harm to the vessel-walls; and that disturbance of innervation alone could hardly account for the changes.

Hartzell² found the blebs situated between the epidermis and the corium, and filled with eosinophiles and a few leukocytes, together with a large number of round cells of uniform size, having a limiting membrane and containing a large cavity. In the papillary and subpapillary layers of the corium was a moderate cellular infiltration, composed largely of eosinophiles. The papillæ were greatly enlarged, especially in the longitudinal direction.

Diagnosis.—Pemphigus vegetans is to be distinguished chiefly from syphilis and the peculiar eruption occasionally produced by the bromids and iodids in which vegetations occur. In a large pro-

¹ Loc. cit.

² Jour. Cut. Dis., 1910, xxviii, p. 111.

portion of cases pemphigus vegetans has been mistaken for syphilis. The close crowding of the lesions about the ano-genital region and their striking resemblance to condylomata, taken in connection with the presence of erosions of the mucous membrane of the mouth, cause the confusion. In pemphigus vegetans the vegetations are more superficial than in syphilis, are of more rapid evolution, and exhibit groups of blebs at the border of the lesion; while the genital condylomata have a smooth border without traces of bullous efflorescence. Further, the surface is stippled (Neumann) and never smooth, as in condylomata, and the mouth lesions are far more painful. However closely packed together may be the condylomata of this region, they rarely spread, as does pemphigus vegetans, beyond the regions adjacent to the mucous outlets; while the bullæ of pemphigus vegetans, when the disease is fairly advanced, are not only numerous, and closely packed together, but they spread also beyond, high toward the pubes, and low over the inner faces of the thighs. There is commonly a history of fever, no lymphatic involvement, and a distinct uniformity of lesions, each separate element being of a bullous type.

That drug-eruptions produce similar lesions should be borne in mind. In the latter case the general health of the patient is unaffected, the mucous membranes rarely involved, and the distribution of the lesions is apt to be about the face and extremities. Early many papulopustular lesions will be present in addition to the vesico-bullous and vegetating variety.

Treatment.—The management of a case of pemphigus vegetans resolves itself into keeping the skin clean, supporting the strength of the patient, and careful nursing. As above stated, in the true cases a fatal termination always occurs, and therefore the treatment has been unsuccessful. The internal treatment consists of the usual tonics—arsenic, iron, quinin, strychnia, etc.—in connection with a nutritious diet. The local treatment of the lesions should consist, first, in great cleanliness, which may be accomplished by bathing or by the use of the continuous bath as much of the time as the patient can stand it. The bullæ may be punctured and the parts dressed, when not in the bath, with a wet dressing of boric acid; or a dusting-powder may be applied after the surface has been cleansed; or the surface may be treated with oleated lime-water, in which opium, phenol, or dilute hydrocyanic acid has been added in the same proportions suggested in the treatment of acute eczema. Weak sulphur ointments and salicylic-acid pastes may also be used to advantage. The ordinary lead-and-opium wash, with or without the addition of zinc oxid, may also answer a good purpose. The lesions in the scalp require the cutting short of the hair of the head in order to make the applications.

In cases where the toxemia is marked, supportive treatment is demanded. Pernet¹ used an autogenous vaccine, made from cul-

¹ Archiv, 1911, cx, p. 509; abstr. Jour. Cut. Dis., 1912, xxx, p. 224.

tures of a coccus and a diplococcus isolated from the skin and blood of a patient suffering with pemphigus vegetans. In addition, the patient had quinin and arsenic internally, but the case terminated fatally. Schamberg¹ noted no improvement in a case treated with an intravenous injection of 0.4 grammes of salvarsan. Weiss² reported improvement in a case treated with x-rays.

Prognosis.—From the foregoing, it is evident that the prognosis is bad. In the so-called true cases of Neumann, the patients have all succumbed to the disease, and the prognosis, therefore, depends in any individual case on whether it is one of the true type or one with vegetating lesions occurring in some other disease.

HYDROA VACCINIFORME.

Synonyms.—Recurrent Summer Eruption; Hydroa æstivale.

Definition.—Hydroa vacciniforme is a recurring vesicular disease, occurring chiefly in the summer season, in young adult male subjects, and solely on exposed parts of the cutaneous surface.

The disease was described first in 1861 by Bazin and later by Hutchinson,³ Jamieson,⁴ Brooke,⁵ Crocker,⁶ Bowen,⁷ Graham,⁸ White,⁹ Brocq,¹⁰ and others.

Symptoms.—The disease usually begins during the first three or four years of life and gradually disappears during the few years following puberty. With but few exceptions, the cases reported have been in boys. The disease is most active in summer, the larger number of patients remaining free from active manifestations during the winter months. The direct cause in most cases is exposure to the sun's rays, though exceptionally warm or cold winds, or even artificial heat, seem sufficient to cause an outbreak.

The eruption is symmetrical and is usually limited to the uncovered parts of the body; the bridge of the nose, cheeks, and ears, and the backs of the hands are the parts most affected. Bazin reported cases in which covered portions of the body were slightly involved. In a case (Plate VIII) observed by Dr. Hyde, a new crop of vesicles and bullæ on the face was accompanied at times by an herpetic keratitis, the resulting scars interfering considerably with vision. The disease occurs in successive outbreaks, each of which lasts for two or three weeks. The intervals between recurrences in the summer may be several weeks, or so brief as practically to be wanting. The lesions often are preceded by sensations of heat or itching; and the first to appear are red macules or elevations, upon which are rapidly formed vesicles or bullæ, varying in size from that of a millet-seed to that of a large pea, and occurring either singly or in groups like herpes.

¹ Jour. Cut. Dis., 1912, xxx, p. 359.

² Clinical Soc. Trans., vol. xxii.

³ Brit. Jour. Derm., 1892, iv, p. 128.

⁴ Jour. Cut. Dis., 1894, xii, p. 89 (with review of literature, and histology).

⁵ Ibid., 1896, xiv, p. 41.

⁶ Ibid., 1898, xvi, p. 514.

⁷ Ibid., 1913, xxxi, p. 509.

⁸ Lancet, August 18, 1889.

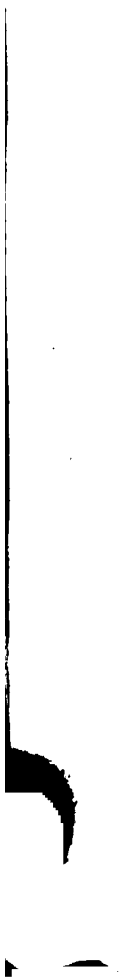
⁹ Diseases of the Skin, 1893, p. 325.

¹⁰ Annales, 1894, s. iii, v, p. 1003.

PLATE VIII



Hydroa Æstivale. (Fordyce.)



They may coalesce and may be surrounded by a halo. These vesicles may dry in a day or two, or they may rupture and form a crust; but many of the larger become depressed in the centre and resemble a vaccination-vesicle. The depressed centre is black or dark-blue, and is surrounded by a ring of fluid, while about the whole is a reddened areola. Some of the lesions may become purulent. The dark centre is converted rapidly into a thick, black crust, which is very adherent, and which on falling leaves a depressed, reddened scar, that eventually becomes white and practically indistinguishable from that of variola. The duration of an individual lesion from its beginning to the formation of the crust is three or four days. The time required for the crust to fall is variable.

The eruption usually is preceded by some slight constitutional disturbance, and by burning or pain at the site of the lesions. Itching is absent, as a rule, though it was marked in Bowen's case.

Hydroa Puerorum.—Hydroa puerorum, originally described by Unna, presents many features in common with the summer eruptions above described. The disease begins usually in the first year of life, each attack lasting about two weeks. The lesions are erythematovesicular, the vesicles frequently coalescing to form bullæ. The lesions may occur on any part of the body, not selecting particularly the exposed surfaces, and undergo involution without subsequent sequels. The eruption is preceded and accompanied by itching and burning sensations. Season is not concerned in the etiology, and spontaneous recovery occurs at puberty. Adding to the above the superficial character of the lesions, which are confined to the rete, Haase and Hirschler¹ make of this disorder an entity.

Etiology.—Exposure of sensitive skins to the sun and wind, especially in the summer season, is the effective cause. We have observed patients in whom the disease was developed not merely in summer, but in winter, when the sunlight was reflected from snow on the ground. Ehrmann² showed that light passed through blue glass was just as potent in causing the eruption as the sun's rays; but when the light was passed through red glass, which absorbs the actinic rays, no lesions resulted. He concluded that the eruption is of photo-actinic origin.

Pathology.—The pathology has been studied by Bowen in two lesions taken from a single patient, and by Mibelli.³ In the primary stage, Bowen found merely vesicle-formation in the middle layers of the rete. In a more advanced lesion he found necrosis involving the lower layers of the stratum corneum, the entire rete, and the corium nearly to the subcutaneous tissue. He concludes that the process begins as an inflammation in the epidermis and upper part of the corium, followed by vesicle-formation in the rete, and later by the necrosis described above. The necrosis is sharply circumscribed,

¹ Trans. VI Internat. Derm. Cong., New York, 1907, vol. i, p. 413; and Jour. Cut. Dis., 1908, xxvi, p. 199.

² Archiv, 1905, lxxvii, p. 163.

³ Monatshefte, 1897, xxiv, p. 87.

and, showing through the vesicles above, produce the black centres of the advanced lesions. Bowen further calls attention to the points of similarity between this disease and acne necrotica or acne varioliformis.

Adamson,¹ in a recent histological study, found vascular dilatation; swelling of the connective-tissue bundles and of the prickle-cells; a serous and cellular exudation breaking through and destroying the prickle-cell layer, forming a vesicle beneath the raised horny layer; and destruction of the superficial part of the papillary layer of the corium.

Diagnosis.—The diagnosis is from erythematous lupus, pemphigus, erythema bullosum, and dermatitis herpetiformis. The limitation of the lesions to the exposed parts of the body, the presence of vesicoblebs, and the scarring, in connection with the age of the patient, all point to the nature of the malady.

Treatment.—The treatment is unsatisfactory. To prevent recurrence, the patient should be guarded from exposure to the sun, and in some cases from hot and cold winds. Veils and coverings which exclude the light may be of service. Crocker recommends treating the eruption by opening the vesicles and applying iodoform in powder or in solution in ether. After removing the crusts with carbolyzed oil, the surfaces may be dressed with an ointment containing iodoform and boric acid.

Prognosis.—Until adult years are attained, the patient is liable after fresh exposure to recrudescence of the disease.

EPIDERMOLYSIS BULLOSA HEREDITARIA.

Synonym.—Acanthosis Bullosa.

Definition.—This name has been given to a rare affection or condition of the skin in which there is a pronounced tendency to rapid formation of bullæ wherever the integument may be slightly bruised or rubbed. Cases have been reported by Goldschneider,² Köbner,³ Valentine,⁴ Elliot,⁵ Beattie,⁶ Bowen,⁷ Wende,⁸ Engman and Mook,⁹ Kanoky and Sutton,¹⁰ and others.

In the major portion of the cases reported the condition had existed from infancy or early childhood, and there was a clear history of heredity. Valentine reported eleven cases which had occurred in four generations of the same family.

¹ Brit. Jour. Derm., 1906, xviii, p. 125. (On cases of hydroa aestivale of mild type, their relationship to Hutchinson's "summer prurigo" and to hydroa vacciniforme.)

² Monatshefte, 1882, i, p. 163.

³ Deutsch. med. Wochenschr., 1886.

⁴ Berlin. klin. Wochenschr., 1885, p. 150.

⁵ Jour. Cut. Dis., 1895, xiii, p. 10; *ibid.*, 1889, vii, p. 539; and New York Med. Jour., April 21, 1900.

⁶ Brit. Jour. Derm., 1897, ix, p. 301 (*résumé* of all previously reported cases).

⁷ Jour. Cut. Dis., 1898, xvi, p. 253.

⁸ *Ibid.*, 1902, xx, p. 537 (bibliography); *ibid.*, 1904, xxii, p. 14.

⁹ *Ibid.*, 1910, xxviii, p. 276.

¹⁰ Jour. Amer. Med. Assoc., April 2, 1910, p. 1137.

Symptoms.—The general health of the individuals thus affected may be excellent, and the skin remain sound so long as it is subjected to no irritation; but in some cases very slight causes (the pressure of a shoe in walking; the grasping of a firm substance, such as the handle of a hammer; the friction of suspenders or waistband) are sufficient to cause the appearance of firm, tense blebs at the site of the irritation. Such bullæ vary in size from that of a small pea to that of a walnut. They often last some days, having a firm roof-wall. They are usually more or less painful, especially after rupture. Occasionally, the bullæ may be hemorrhagic, but as a rule they contain clear serum. In Bowen's case the hemorrhagic type occurred, and the lesions were followed by pigmentation and scarring.

FIG. 87



Epidermolysis bullosa hereditaria. (MacKee.)

The common sites of the lesions are over the elbows and knees, the hands, forearms, and feet, although many other regions are sometimes attacked. After a variable time, atrophic and pigmented areas are noted, and in the major number of cases marked malformation of the finger- and toe-nails occurs, the latter sometimes being destroyed. A sequel which is sometimes seen in pemphigus and has been noted by the author and by many reporters is the presence of grouped milia occurring particularly over the dorsal surfaces of the hands and forearms.

While the major number of these cases begin shortly after birth, cases of a similar nature are reported as beginning later. Fordyce¹

¹ Jour. Cut. Dis., 1912, xxx, p. 168.

suggests that there may be transitional forms between this disease and pemphigus. Klausner¹ reports recurring lesions in the mouth in a patient suffering with this disease, who at the age of twenty-five years developed carcinoma in this location.

The duration of the disorder is variable. The predisposition to the formation of new bullæ remains indefinitely.

Etiology and Pathology.—Aside from the congenital or hereditary character of the disease, little has been ascertained. A valuable contribution to this subject was made by Engman and Mook.² In their studies they found a congenital absence of elastic tissue. In two well-marked examples of the disease, they found elastic tissue absent, or sparsely distributed in the papillary and subpapillary portions of the cutis. In two others, in which the disease was much less marked, the elastic tissue was diminished, but not to such a degree as in the first-mentioned cases. This absence of elastic tissue was discovered in regions other than those occupied by lesions. They suggest the possibility of the disease being caused by the hereditary, congenital, or acquired absence of elastic tissue. In Kanöky and Sutton's cases absence of elastic tissue in the upper part of the corium is also described.

Treatment.—The treatment is unsatisfactory. Arsenic has been used without success. Prophylaxis is the most important consideration.

PELLAGRA.³

Synonyms.—Lombardy Erysipelas, Lombardy Leprosy, Risipola Lombarda, Lepra Italica, La Rosa, Mal Rosso, Pellarella, Alpine Scurvy, Dermatagra.

Definition.—Pellagra (Lat., *pellis*, the skin; *aeger*, diseased) is a chronic, constitutional, endemic disorder, characterized by symptoms

¹ Archiv, March, 1913, cxvi, p. 71; abstr. Brit. Jour. Derm., 1913, xxv, p. 274.

² Loc. cit.

³ Bibliography: Gemma, Ann. univ. di Med., 1871, p. 564. Winternitz, Vierteljahr, 1876 iii, p. 151. Raymond, Annales, 1889, s. ii, x, p. 627. Lombroso, Die Lehre von der Pellagra, Berlin, 1898. Sandwith, Brit. Jour. Derm., 1898, x, p. 395, and Jour. Trop. Med., 1898, i, p. 63. Babes and Sion, "Pellagra," Nothnagel's Spec. Path. u. Therapie, xxiv, Pt. ii, fasc. iii, Vienna, 1901. Scheube, Diseases of Warm Countries, Philadelphia, 1903, p. 311. Manson, Tropical Diseases, 4th Ed., 1907, p. 328. Castellani and Chalmers, Manual of Tropical Medicine, 2d Ed. Sambon, Jour. Trop. Med. and Hygiene, 1910, pp. 271, 282, 305, and 319 (Progress report of the British Pellagra Commission). For further foreign and other references, history, and description of the disease, see Hyde, Amer. Jour. Med. Sci., January, 1910: "Pellagra and Some of its Problems."

Some important American literature: Searcy, Jour. Amer. Med. Assoc., 1907, xlix, p. 37: "An Epidemic of Acute Pellagra." Wood, *ibid.*, 1908, liii, p. 274: "The Appearance of Pellagra in the United States." Watson, Jour. So. Carolina Med. Assoc., November, 1908: "The Etiology of Pellagra." Lavinder, reprint Public Health Reports, July, 1908: "Pellagra: a Precis;" *ibid.*, xxiv, No. 43, October 20, 1909: "The Prophylaxis of Pellagra;" *ibid.*, No. 40, September 10, 1909: "Notes on the Prognosis and Treatment of Pellagra." Lavinder, Williams and Babcock, *ibid.*, xxiv, No. 25, June 18, 1909: "The Prevalence of Pellagra in the United States." Sandwith, Jour. So. Carolina Med. Assoc., November, 1909, v, No. 11: "Pellagra." Watson, *ibid.*, November, 1909: "Symptomatology of Pellagra." Sambon, *ibid.*, February, 1909: "Geographical Distribution and Etiology of Pellagra." Jour. Amer. Med. Assoc.,

referable to the cutaneous, gastro-intestinal, and nervous systems, and having a tendency to seasonal recurrence.

At present, pellagra is most prevalent in northern and central Italy, southern Roumania, the Austrian Tyrol, southeastern Hungary, and the southeastern part of the United States; also in lower Egypt. In America a transient case was reported by Sherwell¹ in 1883. It is only since 1907 that it has assumed important proportions in this country. Among others who have made important contributions to the subject are Searcy, Babcock, Zeller, Lavinder, and the members of the Illinois State Pellagra Commission and the Thompson-McFadden Pellagra Commission.

Symptoms.—The earliest symptoms may be connected either with the skin or the gastro-intestinal tract. Occasionally, the patient suffers with what is presumed to be a sunburn and is indisposed for a short time, when the symptoms clear up, to return the next year or at some future date. In other cases, a moderately sore mouth, with some gastro-intestinal disturbance, particularly diarrhea, occurs, but is considered to be of no consequence, and in the course of a few weeks the symptoms subside, also to return at some future time. During the winter months the patients are very often entirely well. With each recurrence the symptoms are apt to be exaggerated, although at times they have been noted to be more mild.

A certain proportion of cases begin with gastro-intestinal symptoms, consisting of chronic and often severe diarrhea, with more or less stomatitis. These symptoms in certain cases have lasted for one or two months before the appearance of the eruption. In such cases the latter is usually exaggerated and of the bullous type. In other

1909, liii, p. 1659: Trans. Conference on Pellagra, held at Columbia, S. C., November 3 and 4, 1909: Dyer, New York Med. Jour., 1909, p. 997: Howard Fox, New York Med. Record, February 5, 1910: Lavinder, reprint Public Health Reports, xxvi, No. 39, September 29, 1911: "The Salient Epidemiological Features of Pellagra." Report of the Pellagra Commission of the State of Illinois, November, 1911: Ormsby, Jour. Cut. Dis., 1912, xxx, p. 589: Lavinder, Amer. Practitioner, 1912, xli, p. 568: "The Diagnosis of Pellagra." Deeks, Med. Record, March 23, 1912, lxxxi, No. 12: "Pellagra in the Canal Zone."

The following five references are from members of the Thompson-McFadden Pellagra Commission, New York Post Graduate Medical School and Hospital: Siler and Garrison, Amer. Jour. Med. Sci., July, 1913, p. 42: "An Intensive Study of the Epidemiology of Pellagra" (report of progress); and August, 1913, p. 238. Jennings and King, Amer. Jour. Med. Sci., September, 1913, p. 411: A study of the possible carriers of the disease—ticks, lice, bed-bugs, cockroaches, horse-flies, fleas, mosquitoes, buffalo-gnats, house-flies, and stable-flies; and Jour. Amer. Med. Assoc., January 25, 1913, p. 271. Hillman, Amer. Jour. Med. Sci., April, 1913, p. 507: "Some Hematological Findings in Pellagra." Myers and Fine, *ibid.*, May, 1913, p. 705: "Metabolism in Pellagra." MacNeal, *ibid.*, June, 1913, p. 801: "Observations on the Intestinal Bacteria in Pellagra." Also see Southern Med. Jour., March, 1912, for a series of articles by Albright, Jelke, Harris, Lavinder, Menage, Tuberville, Kimbrough, Leroy, Bass, Cole, Niles, Wolff, and Bronson. Nicolaidi, Southern Med. Jour., 1912, v, p. 465: "A New Treatment of Pellagra with the Organo-mineralized Radioactivated Serum of Dr. Jean Nicolaidi, Paris, France;" *abstr.* Jour. Cut. Dis., 1912, xxx, p. 756. See in addition text-books by Marie, translated by Lavinder and Babcock, 1910; Niles, 1912; Roberts, 1912; and Wood. Niles, Jour. Amer. Med. Assoc., 1914, lxii, p. 285: "The Treatment of Pellagra: An Optimistic Survey of its Present Status."

¹ Jour. Cut. Dis., 1883, i, p. 142.

cases the disease runs a more chronic course, exhibiting mild symptoms. In still others the disease may be acute and severe (*Pellagra typhosis*), the patient having a high temperature, severe diarrhea and stomatitis, delirium, and other evidences of intense intoxication.

Seasonal recurrence has been emphasized by practically all observers. The disease has been noted to occur most often in the spring and autumn. In a certain proportion of cases, after an attack has cleared up in the spring a recurrence takes place in the autumn.

Annual recurrences have been noted by many.¹ It appears, however, that in South Carolina no evidence was found by the Thompson-McFadden Commission pointing to a spring and autumn recrudescence or seasonal recurrence.

In a study of the cutaneous lesions, the changes are found to be those of an inflammation of greater or less severity and of shorter or longer duration, the lesions necessarily depending upon these factors. In observing the development of these lesions, it is noted that at first there often occur large macular lesions, light- or dark-red in tint, which soon fuse, forming a patch of dermatitis almost identical in appearance with that caused by the sun. As the evolution of the disease advances, the color of the lesions deepens and they assume a reddish-brown or chocolate hue. In from seven to ten days or a little longer, desquamation begins, at which time a roughened, scaling surface is present. Early in the process there is



Pellagra. (Siler, Garrison and MacNeal, Thompson-McFadden Pellagra Commission.)

moderately marked swelling. In the more active cases, on the erythematous base, there develop bullous lesions, which often attain a large size, and which after a few days gradually dry, leaving a thickened, crusted epidermis. Ecchymoses not infrequently complicate the process, and secondary pyogenic infection may follow in the vesicular and bullous cases. In severe cases ulceration may ensue; in many the edema is sufficient to produce fissures. Whether erythematous or bullous, the lesions are always well defined. After the eruption has disappeared, the skin in some cases is pigmented; in others the pigment is lessened. In certain cases, where the process is less acute, the appear-

¹ Bacon, Jour. Amer. Med. Assoc., liv, p. 1783 (report of a patient who had seven recurrences in seven years).

ance of a chronic dermatitis, with marked hyperpigmentation, is presented. After repeated attacks the skin becomes more or less

FIG. 89



Pellagra. (Siler, Garrison and MacNeal, Thompson-McFadden Pellagra Commission.)

FIG. 90



Pellagra. (Siler, Garrison and MacNeal, Thompson-McFadden Pellagra Commission.)

permanently thickened, hard, roughened, scaly, and pigmented; it loses its elasticity, and its normal lines are exaggerated. The terminal stage is exhibited as a thin, cicatriform, parchment-like integument, presenting striæ parallel with the long axis of the hand.

The lesions are found on the exposed areas of the body chiefly, and their arrangement is characteristic. In the major portion, the dorsa of the hands, the wrists, and some part of the face, neck, or scalp are involved, the feet and ankles more rarely here, but a common site in Europe. The arms and chest, and to a less extent the ears and other parts of the body, including the palms and genital region, are also

FIG. 91



Pellagra. (Siler, Garrison and MacNeal, Thompson-McFadden Pellagra Commission.)

involved. The symmetry of the lesions is striking and characteristic. On the hands often a solid area extends over the entire dorsal surface, involving the fingers, knuckles, and also the wrists on the extensor side for a distance of about two inches. In this area the lesion frequently sweeps around and involves about two-thirds of the flexor surface, then comes to an abrupt ending. This partial gauntlet has been frequently observed. The peculiar collar described by European observers is occasionally seen here, but is uncommon. That the rays of the sun are a factor in determining the localization of the lesions is accepted by all observers. In suspected cases at Bartonville fenestrated gloves were worn, and the erythema was largely limited to exposed areas. Subjective sensations are, as a rule, not marked, and are exhibited as burning rather than itching, the surface practically never showing evidence of scratching.

In the gastro-intestinal system diarrhea is a constant concomitant in severe cases; in mild cases this may be absent and constipation be present. The appearance of the tongue is important. This becomes swollen and denuded, presenting a dry appearance, with, in severe cases, more or less superficial ulceration along its edges and upon its under surface, with yellowish sloughings, which bleed easily. The buccal mucous membrane with which it comes in contact also shows in the more serious cases a similar appearance. A resemblance to the aphthous stomatitis seen in other debilitated states is noted.

The ulcers are very superficial and heal without scar-formation. In mild cases the tongue is reddened and presents smooth areas, especially at the tip and along the margins, a condition to which the term "bald tongue" has been applied by Sandwith.

The nervous system chiefly presents the symptoms induced by acute intoxication. Singer suggests, in regard to the associative system of the brain, that there is a liability to the occurrence of deliria similar to those seen in other infective and toxic states. An important observation was independently made by Wilgus¹ and Singer,² who noted in the terminal stages of pellagra the symptom complex described by Meyer as that belonging to central neuritis. In an examination of pellagrous patients at Peoria, Bassoe³ found changes in the reflexes suggesting the following: (1) probable pyramidal tract degeneration; (2) posterior column degeneration; and (3) combined degeneration.

In the recurrences that take place from year to year the general symptoms become more marked. The gastro-intestinal are indicated by dyspepsia, pains in the abdomen, and dysentery. Pains are described as occurring in various parts of the body, particularly the head, epigastrium, and feet, with burning sensations in these same areas, especially at night. Tenderness on pressure over the spinal nerves; muscular weakness and loss of muscular power, particularly in the legs; tremors of the head and arms; mental worry and depression, anxiety and discontent, loss of memory, vertigo, and vague feelings of pressure, weight, or pulsation about the head, all may occur. In some cases the subjects are excitable and irritable, in others stupid and morose.

The knee-jerk, which is early exaggerated, becomes diminished and finally lost. Various paralyses are described, such as spastic paralysis, ptosis, hemianopsia, diplopia, amblyopia, and midriasis.⁴ In the terminal stage, extreme weakness and emaciation, from the preceding severe gastro-intestinal disturbances, profound prostration, delirium, with involuntary evacuation of the bladder and bowels, close the scene. A marked feature of this state noted in the South⁵ is opisthotonos, a condition in which the patient lies on the bed with the head forcibly extended, and the general musculature in a state of great rigidity.

The duration of the disease extends over periods varying from one to twenty years. Five years is probably an average.

Etiology.—In districts where the disease is endemic, it attacks persons of all ages. Castellani records large numbers of instances of its occurrence in children. Women are affected much more frequently than men, both in Europe and in America. As to occupation, in Europe the field-laborer suffers most. In America, nothing has been determined in this regard except that in the investigation

¹ Report of the Pellagra Commission of the State of Illinois, November, 1911, p. 53.

² Ibid., p. 25.

³ Castellani and Chalmers, p. 1256.

⁴ Hyde, loc. cit.

⁵ Hyde, loc. cit.

by the Thompson-McFadden Commission a large proportion of cases were found among women employed in housework. The disease seems to be confined to the tropical and warm sections of the temperate zones; otherwise, climate appears to exert no influence in the etiology. All observers agree that even in pellagrous sections the disease is more or less restricted to certain localities. In Europe it is largely rural, occurring chiefly among the poor peasants of Italy and the poorer agricultural classes as a whole. A few cases occur in the cities. These facts have been borne out by American investigators of the European disease. In America, on the contrary, the small towns and mill villages in the Southern States suffer most. These observations, made by several southern physicians, are corroborated by the members of the Thompson-McFadden Commission.

In Europe, poor hygiene, poor food, and poverty are unquestionably important factors in the etiology. While these are factors in the United States, they appear not to be important. In the latter situation the disease not infrequently attacks people in the best walks of life, where poor hygiene or lack of proper food is out of the question. Nicolas and Jambon¹ believe the disease is the result of many circumstances, of which poverty and alcoholism are most constant.

Pellagra not infrequently attacks patients suffering with other disorders. Attention has been called by Singer, Babcock, and other observers to the susceptibility of the insane to the disease.

The various theories regarding the production of pellagra are those concerning maize or Indian corn and other agents. The corn theory has been that most strongly advanced in Italy. The views relative to this hypothesis may be summarized as follows: (1) Indian corn is deficient in or lacks some nutrient principle necessary for health, and pellagra results from a diet limited too strictly to that cereal. (2) Corn contains some toxic substance which in susceptible individuals produces the disease. (3) Corn undergoes some form of decomposition in the intestine of certain individuals, as the result of the growth of bacteria, the toxins thus produced exciting the disease. (The above theories refer to corn in its normal state.) (4) Healthy corn is innocuous, but at some stage in its preparation for consumption, either in the ear, when stored, or after being cooked, it undergoes decomposition, as the result of the growth of certain fungi. Various moulds and bacteria have been isolated and assigned an etiological role in the disease by different authors, such as *Penicillium glaucum*, different varieties of the *Aspergillus*, *Sporisorium maydis*, *Ustilago maydis* (smut), *Bacterium maydis*, and *Bacillus pellagræ*. In the growth of these organisms it is supposed that toxins are produced which, when absorbed, induce pellagra. (5) Finally, that some one of the organisms above noted, which are commonly found in mouldy or spoiled corn and which may be eaten with it, directly invades the body and produces the disease. Reed² isolated

¹ Annales, July, 1908, p. 385, and August and September, 1908, p. 480.

² New York Med. Record, January 22, 1910.

a fungus, *Diplodia zeæ*, from "dry rot," a corn-stalk disease, which he thought might be an etiological factor.

In the report of the Illinois Pellagra Commission (p. 48), an account is given of two groups of patients, each consisting of sixty members, one of which was given a full corn diet, the other a corn-free diet, for one year. During this period the disease developed among the members of each group equally. Cutaneous anaphylaxis tests with extracts from damaged corn, and animal experimentation with damaged corn, including polenta imported from Italy, resulted in negative findings.

Certain investigators believe the etiological factor is a bacterium of unknown nature and habitat; others believe it to be due to some variety of ameba. The frequency of concomitant amebiasis in pellagra has been emphasized by Siler and Nichols¹ and Long.² Alessandrini, in Italy, found filarial infection in certain wells in pellagrous districts. Protozoal infection of the blood in much the same manner as in malaria and trypanosomiasis has been suggested by others. These views are all based upon the supposed resemblance in the epidemiology, endemicity, and seasonal occurrence of these disorders. It has been thought that the infectious agent, if there be one, is transferred by a carrier. Sambon³ suggested a species of simulium (the sand-fly or buffalo-gnat). Jennings and King believe that if it is distributed by a blood-sucking insect, the *Stomoxys calcitrans* would appear to be the most probable carrier.

The disease is regarded by most observers as not contagious. Innumerable examples might be cited to prove this theory. It is said that at the Pellagrosario at Mogliano, Veneto, Italy, where large numbers of pellagrins have been treated for many years, no attendant or nurse has ever been known to develop the disease. This sanitarium accommodates from 400 to 600 patients and has from 60 to 70 employés (Lavinder). In the early history of the disease in America, it appeared most extensively in institutions, particularly in insane asylums. In the investigation of cases by the Thompson-McFadden Commission, in one-half of these a single member of a family was affected; in about one-fourth two members of a family were affected; and in the remainder groups of three, four or five members suffered from the disease. On the other hand, King⁴ recorded a group of twelve cases which appeared to have followed the development of the disease in a single case in one family.

Attempts at transmission of the disease have usually been unsuccessful. Harris⁵ was successful in producing in monkeys symptoms resembling human pellagra, employing subcutaneous, intravenous, and intracranial injections of a Buhfeld filtrate prepared from human pellagrous tissues.

¹ New York Med. Record, January 15, 1910.

² Jour. Amer. Med. Assoc., 1910, lv, p. 734.

³ Brit. Med. Jour., 1905, xi, p. 1272.

⁴ Southern Med. Jour., November, 1908.

⁵ Jour. Amer. Med. Assoc., June 21, 1913.

Recently a theory has been advanced by Alessandrini and Scala¹ that silica in colloidal solution in potable waters is an etiological factor in pellagra. The dietary origin, exclusive of corn, has been emphasized by Goldberger and Myers and Voegthlin.²

Pathology.—The histological changes noted in the skin vary according to the stage in which the examination is made. In a series of cases in the early stages, we found the most marked changes in the superficial part of the corium, consisting of a cellular infiltration, particularly in the region of the blood-vessels, and moderate edema of the collagen. In the epidermis hyperkeratosis was the rule, with here and there areas of parakeratosis, evidenced by the presence of nuclei in the stratum corneum. Increased pigment was noted; otherwise the rete showed no changes except where its integrity was interfered with by the infiltrating cells beneath. No microorganisms were discovered. The process appears to be a reaction on the part of the skin to a local toxic agent, or an angioneurotic process influenced from a distant focus. Corlett and Schultz³ found in a case in which repeated attacks of dermatitis had occurred evidence of atrophy of the corium and epidermis, with changes in the nerves of the corium of such pronounced nature that they concluded these were primary and that the other findings were secondary. The nerves exhibited evidence of a combined inflammatory and degenerative process, with disappearance of many axis-cylinders.

The most important post-mortem findings have been those connected with the gastro-intestinal tract, chiefly the intestines and liver, and of the central nervous system. In the former, ulceration of the colon was not infrequent, and in the liver changes were noted by Singer which suggested to him the elaboration of a toxin in the intestine, which enters the circulation by way of the portal stream, and induces the liver changes. Singer⁴ states that "the nervous system presents a picture of axonal chromatolysis involving especially the Betz and larger pyramidal cells of the precentral convolutions and the cells of the nuclei in the cerebellum, pons, medulla, and cord, as well as the post-root and sympathetic ganglia. Besides these changes numerous cells in most cases show a marked pigmentary degeneration of fatty nature similar to that found in the senile nervous system and in some other conditions. With this there is in most cases but little evidence of connective-tissue reaction, and we would especially emphasize the absence of infiltration of the perivascular sheaths. In some cases there is more or less over-growth of glia cells along the vessels and around the nerve-cells. The picture here described is identical with that published by others, notably Spiller and Anderson,⁵ in cases of pellagra, but is also strikingly similar to the picture of central neuritis." Corlett and Schultz⁶ found

¹ Jour. Amer. Med. Assn., 1914, lxiii, p. 868 (editorial with references).

² Ibid., p. 1114 (editorial with references).

³ Jour. Cut. Dis., 1911, xxix, p. 193.

⁵ Amer. Jour. Med. Sci., New Series 141, January-June, 1911, p. 94.

⁴ Loc. cit.

⁶ Loc. cit.

structural changes in the central nervous system involving the nerve-cells and fibers, with marked changes in the chromatin of the ganglionic cells.

Various inflammatory, degenerative, pigmentary, atrophic, and sclerotic changes are described in connection with the viscera and larger blood-vessels.

Marked indicanuria has been noted by Singer,¹ Myers and Fine,² and others, indicating unusual intestinal putrefactive changes.

Diagnosis.—Recalling the classical symptoms of the disease, which include a well-defined, symmetrically placed dermatitis on the exposed portions of the body, and stomatitis of varying grades, associated with gastro-intestinal disturbance, chiefly exhibited as diarrhea, little difficulty will be encountered in recognizing the disorder. At a later date the nervous phenomena, including irritability, depression, melancholia, etc., make the picture still more distinct. Eczema and erythema multiforme have to be excluded. In certain advanced cases symptoms of general paresis are presented, which, in the absence of cutaneous manifestations, might cause confusion; but with a history of the latter having been present, with associated gastro-intestinal disturbance, and with laboratory methods, including the complement-fixation test for syphilis, the disorders may be differentiated. A patient suffering with an aggravated but typical attack of pellagra, who developed upon the subsidence of the pellagrous symptoms general paresis of luetic origin, has been studied by the author.

Treatment.—The general treatment, with special attention to improvement of nutrition, is of the highest importance. In Italy, where a mixed diet has been substituted for the exclusive use of polenta, marked improvement has followed.

Internal medication has been of little value. Chief among the remedies employed are arsenic, iron, quinin, and other tonics. Atoxyl has been tried without much success, while salvarsan³ has been used with indifferent results.

Direct transfusion of blood has been of service in a number of cases.⁴ Hydrotherapy is recommended by Niles.⁵

Local treatment consists in soothing and mild keratolytic applications in the less severe cases, and soothing and antiseptic lotions in the severe vesicular and bullous varieties.

Prognosis.—In the early cases occurring in Illinois, the mortality was high, but recently the figures have fallen greatly. In 1910 the mortality in American patients was about 35 per cent. Bass,⁶ in

¹ Loc. cit.

² Amer. Jour. Med. Sci., 1913, cxlv, p. 705.

³ Nice, McLester and Torrance, Jour. Amer. Med. Assoc., lvi, No. 12 (improvement recorded in three cases); Cranston, *ibid.*, lviii, p. 1509 (eleven patients treated, results not encouraging).

⁴ Cole, Southern Med. Jour., 1912, v, p. 167 (review of 31 cases).

⁵ Amer. Jour. Med. Sci., 1913, clvi, p. 230.

⁶ Southern Med. Jour., March, 1912.

1912, gave 5 per cent. as the figure of mortality in New Orleans. Recovery rarely takes place in the more severe grades. In the earlier and mild forms the prognosis is better.

ACRODYNIA.¹

Synonyms.—Erythema Epidemicum; Cheiropodalgia. Fr., Acrodynie.

Acrodynia is a disease said to be closely allied to pellagra and ergotism. It first appeared in Paris, in the year 1828, and has since been recognized in epidemic form in France, Belgium, Algiers, Mexico, and a few other countries.

Definition.—The disorder is characterized by an erythema situated chiefly on the palms of the hands and soles of the feet, and by general symptoms referable to the nervous system, exhibited in various parts of the body.

Symptoms.—The lesions on the palms and soles in the beginning are described as erythematous spots, accompanied by swelling, ecchymoses, cyanosis, and occasionally even partial gangrene (Leloir). Vesicular and bullous lesions may be present. According to Alibert (quoted by Crocker), the erythema may be preceded by the bullæ, and the eruption may spread over the limbs and portions of the trunk, being followed by exfoliation, particularly over the palmar and plantar surfaces, where the desquamation may occur as large, horny flakes and casts, similar to those seen in other exfoliating dermatoses; while on the trunk dark-brown or blackish pigmentation occurs. One of the most characteristic features of the disorder is the blackish hue of the skin over the breast, abdomen, flanks, chest, axillæ, and inguinal regions. The subjective sensations in the affected areas are numbness, prickling, tingling, and also lancinating pains, accompanied by marked hyperesthesia and a sensation of intolerable heat. Later on these are followed by anesthesia. In severe cases the limbs become edematous, and there may be cramps, pareses, and toxic symptoms. Associated symptoms are gastro-intestinal irritation, with edema of the face and redness of the conjunctiva.

The disease lasts for from two to four weeks, but relapses are frequent. The whole process terminates, as a rule, in the course of two or three months. It seldom proves fatal except in the case of senile or debilitated subjects. The pathology of the disease is obscure, and the treatment is symptomatic, being directed to meet the special symptoms as they arise.

EXANTHEMATA.

For a detailed consideration of the phenomena of the exanthematous fevers, the reader is referred to the standard treatises on the subject in the field of general medicine. Space is allotted here merely

¹ Vidal et Leloir, *Traité des Maladies de la Peau*, Art. "Acrodynie." Hirsch, *Sydenham Society*, 1830, ii, p. 217 (quoted by Crocker).

to a description of the cutaneous lesions by which they are severally characterized. These are unlike in each disease, yet all exhibit certain common characteristics. In all, the eruptions are symmetrical, and in typical cases are general. In each the efflorescence is succeeded by a desquamative or exfoliating condition of the skin. In each there is, within relatively fixed limits, a distinct stadium of the pathological process, within which it is completed, and beyond which, however persistent may be its remote sequelæ, there is no chronic manifestation of the disorder. Each also is produced solely by its specific contagium, derived exclusively from an animal body affected with the same disease, being never, so far as known, generated from any other source, nor merging by imperceptible degrees the one into another. Two of these may rarely concur, but under such circumstances one is always more pronounced in its features, which either closely precede or follow those of the other. No specific medication is known to be capable of arresting any one of them, each pursuing its course uninterruptedly to a favorable or a fatal termination, according to the intensity of the poison present in each case and to the more or less favorable or unfavorable conditions of the sufferer. Finally, it is probable, though not at present demonstrable, that specific microorganisms are etiological factors in the production of each.

Rubeola.—**Synonyms:** Measles, Morbilli. Ger., Masern, Flecken; Fr., Rougeole; Ital., Rosolia; Sp., Serampion.

Symptoms.—After an incubation period of nine to eleven days, prodromal symptoms of the disease appear: fever (102°–104° F.), chills, rarely convulsions, an incessant, hacking cough, and catarrhal inflammation of the conjunctiva, nasal mucous membrane, and larynx. Prodromal rashes are also found in carefully observed cases; there may be urticarial, erythematous, or scarlatiniform lesions. Rolleston, in thirty cases observed, records these occurrences in 42.8 per cent. The most important recent contribution to the literature of measles describes another manifestation of the period of invasion: "Koplik's spots." These appear on the mucous membrane of the palate, uvula, lips, and cheeks of nearly 90 per cent. of patients, often as early as seventy-two hours before the appearance of a characteristic exanthem. Pinhead- to split-pea-sized, bluish-white, glistening spots, or brilliantly red patches, with a bluish-white punctum centrally situated in each, become visible. The value of this early sign of the disease has been corroborated by other observers.¹

Period of Efflorescence.—The eruption of measles usually appears on the morning of the fourth day, first upon the face (the forehead and temples), and thence extends in about thirty hours over the neck, the upper portion of the trunk, and the superior extremities. Between the fourth and sixth day of the disease, it usually attains

¹ Filatou, *Akute Infektionskrankh.*, 1895. Weiss, *Wien. klin. Wchschrft.*, 1899, xii, p. 683; abstr. *Brit. Jour. Derm.*, 1900, xii, p. 33. Williams, *Bristol Med. and Chir. Jour.*, 1900, xviii, p. 139; abstr. *Brit. Jour. Derm.*, 1900, xii, p. 331.

its deepest shades of color and its maximum of development over the entire surface of the body, including the palms and the soles. This maximum attained, the eruption gradually fades; the tumid condition of the skin, most noticeable on the face, also subsides; the catarrhal symptoms and cough become less annoying; and the patient enters upon the period of desquamation.

The eruption is almost invariably symmetrical, and is characterized by the occurrence of a diffuse, reddish, yellowish-red, mulberry-red, deep raspberry-red, or, in extreme cases, violaceous coloration of the skin; or of pea- to small finger-nail-sized (a millimetre to a centimetre in diameter), oval, round, or irregularly shaped, fairly well-defined macules, either not elevated or very slightly raised above the general level of the integument; or by the occurrence of large-pinhed-sized, discrete papules, much more rarely pinpoint-sized vesicles, corresponding in color with the shades described above, and highly suggestive of the first efflorescence in variola. These lesions become pale under pressure, exhibiting then a yellowish tint, and often are set together closely, particularly over the upper segment of the body, in patches suggesting a crescentic outline. The word "suggesting" is used here purposely, as it is difficult, by selecting a single patch, to determine by the eye alone the existence of such a configuration; while an examination of the eruption as a whole may often very clearly convey this impression to the sight. Usually, patches of sound skin can be recognized, even when the eruption appears to be confluent, but the confluence never occurs so completely as to form a sheet or mask over the entire skin-surface. Individual lesions may so merge as to be well-nigh indistinguishable separately; yet, on the whole, the eruption deserves fully the plural character of its English name. It is made up in all cases of innumerable elements, whose identity is never wholly lost. Some valuable suggestions concerning the distribution and causes of the localization of the eruption have recently been made by von Pirquet.¹

The subjective sensation awakened is occasionally a severe itching or burning; frequently this is an insignificant matter compared with other disagreeable symptoms—the cough, coryza, and fever.

The exanthem spreads from the face to the upper extremities on the second day of the rash, and over the lower limbs on the third day. Its complex expression usually coincides with decided aggravation of the catarrhal symptoms.

Period of Desquamation.—The decline of the disease is accomplished usually with cessation of fever and the production of delicate yellowish-brown pigmentations of the surface where the elements of the eruption have existed, involution being manifested first in the site of the lesions which were earliest to develop. The scaling when present is usually of moderate grade. Gradually and simultaneously

¹ Zeitschr. für Kinderheilkunde, April, 1913, i, pp. 1 and 252; abstr. Jour. Amer. Med. Assoc., 1913, lxi, p. 1337.

the catarrhal symptoms of the respiratory passages diminish in severity. This final stage of the disease in favorable cases usually is terminated in a fortnight from the date of invasion.

The complications¹ and anomalies of measles depend upon the intensity of the poison, displayed in the most formidable symptoms where human beings are crowded together, as in camps and prisons; upon the degree of physical vigor; and also upon the various hygienic surroundings of the victims of the disease. Thus, the period of efflorescence may be unusually prolonged; the eruption may disappear suddenly, and as rapidly reappear; the cutaneous symptoms may alone be wanting; the latter may be commingled with petechiæ due to cutaneous extravasation of blood, which may also be accompanied by severe epistaxis; and the catarrhal condition of the mucous surfaces affected may terminate in croupal or in diphtheritic disease, or be followed by capillary bronchitis, catarrhal pneumonia, and even by pulmonary tuberculosis. Typhoid conditions may also supervene, and chronic inflammatory affections of the eyes and of the Schneiderian membrane result. Scarlet fever and other exanthemata may occur.²

Local pus-infections, such as impetigo, furunculosis, and abscesses, are occasional cutaneous complications during convalescence, as is also gangrene. The latter (*noma*; *cancrem oris*) may attack the mucous membrane of the mouth and may be formidable. Multiple disseminated lupus vulgaris (see chapter devoted to this subject for references) not infrequently follows measles. Erythema nodosum³ has been noted by several independent observers.

Etiology.—The disease is infectious and contagious, being communicable from person to person, but the virus is transmitted less readily by the medium of fomites than in other exanthemata, and is usually rendered innocuous by exposure to sunlight and air. The malady is contagious in all stages, even before that of eruption; and the effective agent is present in the blood, as shown by inoculation-experiments during the prodromal stage. (An experimental study of the infectivity of the blood, secretions, and scales in measles has been made by Anderson and Goldberger.⁴ An infective agent was not demonstrated in the scales.) Susceptibility, save in those protected by previous infection, is general, and second attacks of the disease are on record, the most of such, however, being open to suspicion, since roseola (German measles) may follow rubeola.

The disease is chiefly one of infancy, probably because at that age there is always the largest number of individuals unprotected by previous attacks. In every case the malady results from con-

¹ Craster, *Amer. Jour. Dis. of Children*, August, 1913, vi, p. 65 (an analytical study of one thousand cases of epidemic measles relative to complications, age, incidence, etc.).

² Williams: "Rubeola, Scarlatina and Fourth Disease." *Brit. Med. Jour.*, 1901, ii, p. 1797.

³ Joynt, *Brit. Med. Jour.*, April 15, 1911; abstr. *Jour. Cut. Dis.*, 1911, xxix, p. 513.

⁴ *Jour. Amer. Med. Assoc.*, June 8, 1911, lvi, p. 113; August 5, lvii, p. 476; September 16, lvii, p. 971; and November 11, lvii, p. 1512.

tagion, mediate or immediate, from an infected human subject. It spares neither age nor sex, though it is much rarer in advanced years than in other periods of life, probably because of the large number who at such period enjoy immunity, and is rare under the age of five months.

Pathology.—The pathology of the cutaneous lesions in measles is that merely of acute hyperemia, occasionally passing into exudation, limited for the most part to the vascular papillæ of the corium and the perifollicular plexuses of blood-vessels. There is edema of the fatty tissue surrounding the coil-glands, in the sheaths of the larger vessels, the cutaneous muscles, and the hair-follicles. The coils, follicles, and muscles seem to swim free in widely dilated spaces. There is no cellular exudation and no mitosis (Unna). Post-mortem, the eruption fades, as the result of gravitation of the blood from the anterior aspect of the body as it reclines upon the dorsum. Lessage,¹ studying the disease in 200 cases, often cultivating a delicate micrococcus on gelose, reports the production of something like the disease by inoculation.

Diagnosis.—The diagnosis of importance is between scarlatina and variola. Typical cases with a well-developed eruption can scarcely be mistaken if the symptoms displayed are assigned their full weight. It would be useless, however, to deny the fact that atypical forms occur, which have confused the most expert diagnosticians; in all cases of doubt, the prudent practitioner will refuse to decide as to the nature of the disease until unmistakable symptoms in the lapse of time have been declared. The resemblance between the developed measles and certain of the eruptions seen in varioloid is striking, and the greatest skill, at a given moment of time, will in cases fail to make a decision between the two. A distinctly crescentic character of the eruption, the prevalence of an epidemic, the discovery of Koplik's spots, the presence of catarrhal symptoms, the continuance of fever after the efflorescence is completed, the color of the eruption, and the discovery of the nature of the disease from which the contagion was derived, all point to the truth. From scarlatina measles is differentiated much more readily by the macular or papular elements of its eruption; by their cyanotic, darker hue; by their appearance to a marked degree upon the face; and by the absence of the sore throat, tenderness of the neck, characteristic "strawberry tongue," and usually intense febrile access of the first-named disease. From the various forms of erythema accompanied by fever, as well as from medicinal rashes, insect-bites, and syphilitic eruptions, measles can be distinguished by the irregular temperature-record, as well as by the character of the eruption. The diagnosis between rubeola and rōtheln is given later.

Treatment.—The treatment of measles should be limited to careful hygiene, a restricted "fever diet," the strictest isolation, disinfection,

¹ Bull. de la Soc. méd. des Hôpit. de Paris, March 15-20, 1900, iii s, xvii, p. 282.

and ventilation, and to the use of only such medicaments as especially are indicated. The antithermic remedies employed in the general management of the febrile process may be required in special cases.

In the way of local treatment, the skin should be anointed with a bland, oily, or fatty substance, to relieve the itching sensations, especially after sponging of the surface once daily with a weak alkaline solution, which may be used cool without fear of producing "repercussion" of the exanthem. Eucalyptus, used as a local application on the skin and also as a spray for the nasal passages, has been found of value.¹ The chamber of the invalid should be somewhat darkened for the sake of the eyes, but pure air should constantly be admitted.

Prognosis.—The prognosis is in general favorable, but is of the gravest in special conditions. All the complications named above increase the gravity of the disease, which is also enhanced among men crowded together in camps, children in public charities, in pregnant women, the cachectic and those greatly enfeebled from disease, very young infants, old men and women, and residents of islands that have been long unvisited by epidemics of the malady.

Rötheln.—**Synonyms:** Rubeola, Rubeola Notha, Rubella, German Measles, Hybrid or Bastard Measles, French Measles, Epidemic Roseola. Fr., Rubéole; Ger., Rötheln.

Symptoms.—This is a disease which occurs, as a rule, in epidemics. The contagiousness varies in different epidemics. The period of incubation is usually from one to three weeks. Enlargement of the posterior cervical glands is an important feature of the disease. Occasionally, glands in other parts of the body are enlarged. This symptom is less marked in measles. There is usually no fever; when such is present it only lasts for the first two days of the illness. In an average case the temperature runs from 100° F. to 102° F., though it has been known to reach 104° F. in rare instances. Prodromes, such as malaise, cephalalgia, articular pains, nausea, and vomiting, are quite exceptional.

The eruption is usually the first evidence of disease. Its polymorphous character is the most striking feature; it may present the appearance of scarlet fever on one part of the body and of measles on another part; or, in a given epidemic, one patient may have a scarlatiniform eruption and another patient a rash of morbilliform type.

The eruption occurs for the most part in the regions affected by measles—first on the face and scalp, later on the neck, the trunk, the upper and finally the lower extremities—in the form of multiple, discrete, pinpoint- to small pinhead-sized macules, but smaller than the lesions displayed in measles, and decidedly lighter in color. The shade is from a rosy- or pinkish- to a crimson-red, rarely lurid, never of dark mulberry or violaceous hue. This color at times will be perceptible beyond the line of the lesions as a delicate halo, a cir-

¹ Elgart, *Med. Klinik*, Berlin, August, 1913, ix, No. 31, pp. 1238 and 1276; abstr. *Jour. Amer. Med. Assoc.*, September 13, 1913, lvii.

cumstance which strongly distinguishes the exanthem from morbilli. The lesions, moreover, seldom are arranged in crescentic outline, more often being grouped in roundish or oval patches. Often, indeed, the elements of the eruption are discrete and disseminated, and after complete evolution may be elevated slightly above the general surface. The fauces occasionally are reddened in puncta. The eruption commonly fades in from a few hours to one or two days, and there may be slight resulting cutaneous desquamation.

The objection to regarding r  theln as a clinical entity¹ has been answered by the observation of epidemics in wards full of patients, simultaneously affected and all presenting mild symptoms.

Etiology and Pathology.—The disease occurs in epidemic form; is distinctly infectious and contagious; attacks an individual but once in a lifetime; affords no immunity in subsequent exposure to either measles or scarlatina; and attacks usually young subjects.

Diagnosis.—The epidemic character of the disease, its mildness, the sudden appearance of an eruption without prodromes, the transitory character of the fever, the adenopathy, its occurrence in children who have previously had measles, together with the character of the eruption as described above, are the points on which to rely for the diagnosis. Erythema caused by gastro-intestinal autointoxication must be considered.

Treatment.—R  theln should be treated by rest in bed, an abundant supply of fresh air, strict asepsis, and the usual diet of fever patients. Medication by drugs rarely is indicated.

Scarlatina (*Scarlet Fever, Scarlet Rash, Canker Rash.* Ger., *Scharlach*; Fr., *Scarlatine*).—The period of incubation of scarlet fever varies between twenty-four hours and six days, the average duration being about three days. This incubative period, like that described in connection with measles, may be unproductive of physical symptoms, or may be associated with ill-defined malaise.

Symptoms.—The prodromes are of importance in diagnosis. There is an abrupt onset to the disease. The attack begins with vomiting, a slight headache, or a characteristic sore-throat. In children a convulsion is frequently the first symptom. On examination the patient is found to have a rather characteristic rapid and bounding pulse, an exceedingly dry skin, and a high body-temperature (102  –105   F.). The tongue is seen to have a creamy white coating, through which the red filiform papill   protrude; this is the so-called “strawberry-tongue.” The velum, the pillars of the fauces, the tonsils, and all exposed mucous surfaces are engorged, tumid, reddened, and often covered with deep reddish puncta, which represent hyperemia of the perifollicular tissues. In severe cases the mucous surfaces may speedily exhibit finger-nail- to pigeon-egg-sized, ashy ulcerations, with a lurid halo at the periphery. On the first visit the physician should note

¹ Dillingham, Amer. Med., 1903, vi, p. 263; Griffith, Philadelphia Med. Jour., 1902, ix, p. 659.

the condition of the lymph-glands; those of the neck are usually somewhat enlarged, and those in the groin may be swollen. In children there may be syncope, delirium, convulsions, or, when the toxemia is intense, the result may be fatal before the eruption appears. In some cases purpura, which is frequently mistaken for hemorrhagic small-pox, appears in this fulminating form of the disease. This prodromal period usually lasts from twelve to twenty-four hours, though it may be prolonged for two days more. In this respect scarlatina is markedly distinguished from measles. This stage is terminated by the appearance of the exanthem, but the fever persists without abatement after the explosion; and the other symptoms of the disease are then in no wise ameliorated. Authors describe three distinct types of the disease: the simple, the septic, and the toxic.

The eruption in scarlet fever commonly begins about the neck and clavicular region and spreads rapidly downward over the trunk and extremities, including the dorsal surfaces of the hands and feet, attaining complete development in the course of the second day. The rash is exhibited first in the form of light- or deep-red, pin-head-sized puncta about the hair-follicles, closely agglomerated; and, second, in the form of a superadded erythema, giving to the eye the impression of a diffuse reddish blush. It is then of a distinctly scarlet color, whence the disease derives its name in Latin, English, and German, a coloration frequently compared with the appearance of a boiled lobster. Upon the limbs the eruption is often developed in punctate form, while the diffuse scarlet blush is best seen over the trunk. Occasionally, the eruption is developed in areas with normal intervening skin, when it presents a blotchy appearance. Not infrequently, miliary vesicles, disseminated or grouped, are seen, chiefly over the abdomen and chest, and to a lesser extent over the limbs.¹ The face presents a characteristic appearance, the picture here differing markedly from that seen in measles. The cheeks are flushed, and a few lesions may be found on the temples and forehead, while about the mouth the integument is generally pallid. On pressure, the color may be removed, and after a temporary return of redness a white area may persist for some moments. Drawing the finger-nail rapidly over the surface of the skin is followed by the formation of a whitish-yellow line, which persists for some time, and letters may be thus inscribed, which remain visible for some minutes.

The period of efflorescence lasts for one or two days to a week, during which time the systemic disturbances continue. At this time the specific gravity of the urine is raised and albumin and casts frequently appear.

Having attained its apogee, the eruption in favorable cases begins to fade, the part first affected exhibiting earliest a lighter shade, while the other pathological phenomena diminish in severity, the sore-throat, especially in ulcerated conditions, alone persisting. In from

¹ Schamberg, *Diseases of the Skin and Eruptive Fevers*, p. 461.

four to ten days longer, the eruption disappears, leaving a brown-yellow pigmentation of the skin-surface; simultaneously the other symptoms of the disease vanish.

The desquamation which ensues as convalescence progresses is general, and is often proportioned in extent to the severity of the preceding eruption, though it may be generalized after a well-nigh imperceptible exanthem. Desquamation is more pronounced and characteristic in scarlatina than in any other of the eruptive fevers. It may be superficial and furfuraceous in character, or the epidermis may fall in lamellated layers; for example, the sheath of an entire finger, with the nail, or that of the entire palm. In this way sheets, ribbons, and shreds of the horny layer of the skin may fall from its surface and expose a new and often tender epidermis beneath. The hairs may simultaneously be shed. When this desquamation is finished, the stadium of the disease may be regarded as concluded. The entire period lasts in uncomplicated cases from a fortnight to a month or six weeks.

Septic (Anginose) Scarlatina is characterized by the gravity of the throat-symptoms. In such cases a parenchymatous inflammation of the tonsils, velum, and fauces supervenes at an early period, with enormous tumefaction, involvement of the submucous tissue and neighboring glands, and ulcerative, suppurative, and even gangrenous complications, which speedily may prove fatal.

Toxic Scarlatina (Scarlatiniform Typhus. Fr., Scarlatine Foudroyante).—This severe type of the disease is that in which symptoms of typhus are pronounced. Here the patient may perish within a few hours after attack and before the eruption appears, exhibiting comatose or convulsive symptoms, indicating the profound influence of the intensely intoxicated blood upon the nervous centres; or the eruption may appear ill developed, often livid, hemorrhagic, or petechial in type, and be followed by albuminuria, meningitis, diarrhea, coma, and death.

The *complications, anomalies, and remote sequels* of scarlatina are so numerous as to furnish a vast array of facts for the study of the pathologist. The reader need merely be reminded that the usual incubative and prodromic stages of the disease may be brief as to time, or be followed so brusquely by eruptive phenomena as to be indistinguishable. The latter may also first occur upon the extremities or trunk, and later on the neck and over the clavicles; or at once cover the totality of the surface by a rapid explosion; or be extremely short-lived; or be altogether absent; or be unusually prolonged and visible for even a fortnight upon the surface of the body, appearing and well-nigh disappearing without appreciable cause. To a proportionate extent, the state of desquamation may be reached precociously or tardily, and the exfoliating process be prolonged tediously and be of intense type, jeopardizing in this manner the future of the convalescent prostrated by the fever which has passed or the sympathetic fever which may thus be awakened.

The anomalies of the scarlatinal rash are numerous, but they depend, in general, less upon variation in the intensity of the poison than upon the physical condition of the patient. Thus, the affected surface may be elevated slightly above the general level; there may be no coincident pyrexia; the skin may exhibit irregularly disposed mottlings and maculations; the rash may be characterized by the occurrence of miliary papules, minute vesicles, blebs, or purpuric lesions, well defined against the general scarlet color of the skin by their violaceous shade, and due to cutaneous extravasation of blood. The rare bullous, pustular, and urticarial lesions which may appear upon the skin are accidental and bear no relation to the specific history of the disease.

Catarrhal and parenchymatous nephritis is justly dreaded during the desquamative period of the malady, when it may prove fatal after a relatively benign manifestation of the disease in its prodromal and eruptive stages. Gastro-intestinal disorders may also prove dangerous. An otitis externa, media, or interna may perforate the tympanum, destroy the ossicles, induce caries of the mastoid process of the temporal bone, and prove fatal by the eventual production of meningitis or phlebitis. To this grave list of disorders which may complicate scarlet fever must be added pneumonia, pericarditis, pleuritis, peritonitis, chronic purulent nasal catarrh (which may result in caries of the nasal bones), destruction of the cornea as a result of severe keratitis, persistent adenopathy of the subcutaneous glands, and malnutrition in many forms, which may so impair the vigor of the constitution as to leave the sufferer a physical wreck for the remainder of life.

All observers agree that many of the complications arising in or following scarlet fever are due to the streptococcic infection found in the throats of these patients.

Etiology.—The disease is produced exclusively by contagion derived from the animal body affected with scarlatina, either mediately or immediately, and may occur as an epidemic. It attacks individuals of both sexes and all ages, but more commonly infants and children. The aged are more rarely attacked, probably because of the immunity conferred by an attack early in life. Individual immunity must account for the cases in which unprotected infants exposed to the disease fail to receive it, a fact noted occasionally in epidemics of all the contagious diseases. The contagious element seems to be most active during the eruptive stage of the disease.

Pathology.—Klein, Baginsky,¹ Class,² and Weaver³ have studied the *Streptococcus pyogenes*, which is usually present in scarlet fever. It is now generally accepted that this microorganism is not the cause of the disease, but rather a secondary invader responsible for some

¹ Berlin. klin. Wehnschrft., 1900, xxxvii, pp. 588 and 618; Lancet, 1900, ii, p. 1234.

² Med. Record, 1899, lvi, pp. 330 and 513; Jour. Amer. Med. Assoc., 1900, xxxv, p. 799.

³ Jour. Med. Research., 1903, ix, p. 246.

of the consequent inflammatory and suppurative lesions. The micro-organism which is the causal agent has not been discovered. Malory has described protozoön-like bodies found in the skin of four cases. Duval¹ has confirmed his findings. The possibility of this protozoön being the cause of the disease is now *sub judice*.

Döhle² described some peculiar inclusion bodies present in leukocytes. The conclusions arrived at by several observers³ are that in all cases of scarlet fever, excluding the malignant, fatal, toxic type, these bodies are present during the first four days, but are usually absent after the eighth day. They are also found in diphtheria, tonsillitis, measles, and streptococcic infections, but are absent in toxic rashes. Their significance is not determined.

Vipond⁴ describes a bacillus discovered in lymphatic glands in scarlet fever, capable of producing the disease in the higher apes. Landsteiner and Levaditi⁵ successfully transmitted the disease to these animals, but were unable to determine the nature of the virus. On the other hand, Draper and Hanford⁶ obtained negative results in their attempt at transmission of the disease to monkeys.

The cutaneous lesions of scarlatina, like those of measles, depend upon hyperemia due to vascular dilatation of blood- and lymph-vessels and a moderate degree of exudation. The latter, when it occurs, is limited for the most part to the rete and papillary layer of the corium. There is no diapedesis of leukocytes, though clusters of connective-tissue cells may be demonstrated about the papillary loops of the capillaries. Mast-cells and mitoses appear when desquamation begins; plasma-cells are absent. According to von Jürgensen, the result is a vasomotor paralysis of the peripheral vessels. The signs of the disorder are not apparent in the dead body unless there have been exudation of blood and the consequent formation of petechiæ.

According to Unna, the epidermis, when the disease is fully developed, is the seat of a parakeratosis productive of scaling, while the prickle-layer shows neither edema nor emigration. In the cutis there is a maximum of congestion without distinct edema. The general vasomotor disturbance leading to a species of vascular paralysis is supposed to be due to changes in the nervous centres produced by the disease.

The blood in scarlet fever shows a pronounced leukocytosis and an early increase in eosinophiles, a point of value in differentiating the disease from toxic rashes.

Diagnosis.—The diagnosis of scarlatina from measles, rötheln, erysipelas, and the erythemata in general is established readily. The

¹ Virchow's Archiv, 1905, clxxix, p. 485.

² Centralb. f. Bac. u. Parasit., 1911, lxi.

³ Kretschmer, Berlin. klin. Wochenschr., 1912, xlix, p. 499; Nicoll and Williams, Archives of Pediatrics, 1912, xxix, p. 350; and Granger and Pole, Brit. Jour. of Children's Dis., 1913, x, p. 1.

⁴ Archives of Pediatrics, 1911, xxviii, p. 564.

⁵ Abstr. in the Jahrb. f. Kinderheilk., 1912, lxxvi, p. 218.

⁶ Jour. Exper. Med., 1913, xxii, p. 499.

sore-throat, intense fever, punctiform scarlet rash reaching to the border of the inferior maxilla, and the distinct, whitish-yellow line traceable by the finger-nail when passed rapidly over the surface, are all characteristic. In measles the macular character of the rash and its crescentic arrangement, in connection with the catarrhal symptoms, will usually be recognized. From erysipelas, scarlatina can always be distinguished by the absence of the peculiar, shining, smooth or glazed, and tumid condition of the affected area. From all other rashes, scarlet fever can be distinguished by the pyrexia symptoms and resulting desquamation. For the distinction between scarlatina and erythema scarlatiniforme, the paragraphs devoted to a description of the malady last named may be consulted.

Great care should be taken not to confound the drug-rashes having a scarlatiniform appearance with the specific disease under consideration. Thus, belladonna, in doses of 1 minim of the tincture every hour to the extent of four doses, has produced an abundant scarlatiniform eruption in children, a diagnostic point of importance, in view of the fact that the drug named has been employed as a prophylactic against the disease. For eruptions of this sort due to quinin and other drugs, the reader is referred to the pages devoted to *Dermatitis Medicamentosa*.

Koessler,¹ in a study of the complement-fixation test in scarlet fever, using an extract of lymph-nodes as antigen, obtained positive reactions in 68.6 per cent. of 118 cases examined.

Leede² found that by placing a constricting band above the elbow of scarlet fever patients petechial hemorrhages were produced below the constriction. This phenomenon occurred in all but one of 200 cases of scarlet fever, and was absent in other diseases, except to a modified degree in measles. The phenomenon occurs in from five to twenty minutes after the constrictor is applied.

Treatment.—The modern treatment of uncomplicated scarlatina is antiseptic and expectant, after provision is made for an abundant supply of fresh air, disinfection, a proper regulation of food and drink, and the local use of baths, tepid or cool, for the purpose of reducing the body-temperature. After these baths the skin should be anointed freely with a fatty substance, such as cold-cream salve, scented almond- or olive-oil, or with vaselin. These inunctions are not only grateful to the patient, but they also reduce the body-temperature to a slight degree. Oil of eucalyptus is advocated by Milne,³ to be used as a local application over the entire surface of the skin. This method is said to lessen the spread of the disease. All treatment other than that suggested above pertains to the field of general medicine, and should be limited to the special conditions presented in each case. Such treatment includes the management

¹ Jour. Amer. Med. Assoc., 1912, p. 1529.

² Münch. med. Wochenschr., 1911, lviii, p. 289; abstr. Jour. Amer. Med. Assoc., 1911, lvi, p. 858.

³ Brit. Med. Jour., October 31, 1908.

of disorders of the eye, ear, throat, kidneys, and other viscera, the involvement of which constitutes a complication of the disease.

Walters¹ records the successful employment of a streptococcic vaccine used as a prophylactic measure.

Prognosis.—The prognosis of the malady should always be established with reserve. It is largely based upon the relative intensity of the symptoms, the vigor and age of the subject, and the presence or the absence of serious complications. Albuminuria is rarely absent, and is not *per se* alarming; but anasarca and other evidences of profound interference with the renal function are to be assigned due weight. In general, it may be said that a high range of temperature; early and ulcerative throat-lesions; the puerperal state; tardy development, rapid and untimely disappearance, or undue prolongation of the exanthem; and its admixture with petechiæ to such an extent as to indicate extensive hemorrhagic extravasation, are all formidable symptoms. Finally, it must not be forgotten that the mildest and simplest forms of the disease, after the fastigium is passed and convalescence is actually established, may terminate fatally by the supervention of uremia, cerebral paralysis, or even meningitis, consequent upon secondary changes in the middle or internal ear.

The Fourth Disease (Duke's Disease).—Duke described a disease which he believed belonged to the acute exanthemata group. The period of incubation was nine to twenty-one days, as in German measles. Prodromes were absent, excepting malaise and slight sore throat in the early onset of the disease. The rash appeared rapidly and spread over the entire body in a few hours. The color was brighter than in scarlet fever. There was some glandular enlargement and but little temperature (101° F.). There were no sequelæ. This disease has not been accepted as a clinical entity.

Variola.—**Synonyms:** Small-pox, The Pocks. Ger., Blättern Pocken; Fr., Petite Vérole; Ital., Vajuolo.

Symptoms.—The period of incubation of the unmitigated disease varies between five and twenty or more days, occupying usually twelve days or a fortnight. It is characterized by the peculiarities of that period recognized in all the exanthemata, there being few and insignificant or no evidences of physical discomfort. The prodromic stage is ushered in generally by an evening chill, succeeded by fever, with a temperature rising to 104°–106° F. This is commonly associated with severe and characteristic pain in the loins, headache, epigastric pain, nausea or vomiting, and occasionally, in young subjects, with delirium and convulsions. The fever continues, with alternations of exacerbations and partial relief, or sensations of chilliness, during the second and third days. At the same time there may be faucial hyperemia and moderate dysphagia. Occasionally, before the cutaneous exanthem appears, minute reddish papules may be recognized upon the buccal membrane.

¹ Jour. Amer. Med. Assoc., February 24, 1912, lviii, p. 546.

PLATE IX



Variola, eighth day of eruption. (Heman Spalding.)

PLATE X



Variola, eighth day of eruption. (Heman Spalding.)



The variations of variola as to the severity, character, and duration of its symptoms are so great as to preclude complete description of this malady within the limits here assigned. The following paragraphs are therefore devoted to a sketch merely of its more commonly recognized characters.

Initial Rashes (*Variolous erythema*; *Variolous roseola*).—These may be either (a) erythematous in character, and general or partial; or (b) hemorrhagic, in the form of pure petechiæ or of admixtures of petechial and erythematous blotches.

On the second and third days there appears in some cases, especially in menstruating women and in young subjects, a cutaneous efflorescence, the significance of which may be misinterpreted, thus leading to errors in diagnosis. To Hebra we are indebted for its distinct recognition as a cutaneous prodrome in variola. The interpretation of this exanthem is a matter of special importance to the diagnostician, as many have been deceived respecting its nature and significance. It is characterized by the occurrence of irregularly disposed and distinctly outlined maculations, puncta, striæ, streaks, or a diffuse blush of bright or lurid reddish hue; the invaded integument being at times slightly tumid, and thus elevated above the general level. The affected part may also be the seat of moderate itching. The blush may fade under pressure, but rarely does so perfectly. One cannot by the finger produce upon it a visible whitish spot. The rash may be diffused widely, but occurs most often about the groins, the hypogastric region, the pubes, and the inner faces of the thighs; and on examining these parts the physician will usually discover the evidence, in adult women, of recent or present menstruation, or of the puerperal state. It occurs also about the axillæ, the extensor faces of the larger and smaller joints, and the lumbar and clavicular regions. Often a broad area of the integument in these parts may exhibit a sheet or mask of dull-crimson erythema, upon which may form pinhead- to bean-sized, dull-reddish papules, which do not lose their color under pressure, or, more rarely, petechiæ, vesicles, and wheals. All these are precursory phenomena, and are not transformed into characteristic variolous lesions. They fade almost completely before the latter appear. Rarely, a few scattered papules may be distinguished upon the face and the arms before the variolous erythema fades. Often the papules in full development are even less profusely displayed on the site of the precedent efflorescence. The latter need not necessarily be regarded as a symptom of portentous gravity. The entire surface of the abdomen may be covered with a uniform erythematous blush of dull-crimson hue, followed by confluent variola, and the patient ultimately recover. The physician, then, confronted with a deep-red erythema of the regions named, especially of the groins, the lower part of the abdomen, and the thighs of a menstruating woman affected with high fever, nausea, vomiting, and lumbar pain, should invariably suspect the presence of variola.

The vivid red or empurpled rashes of hemorrhagic type occur most

frequently in the localities named above when the disease assumes a grave aspect, as in hemorrhagic variola.

Smallpox Eruption.¹—The period of the eruption in variola is characterized, at its earliest, by punctiform, subcutaneous discolorations, which photography alone can reveal. Commonly, the patient will be seen on the morning of the third, or oftener the fourth, day with the face and scalp covered with pinhead-sized and larger, firm, conical papules, the touch of which suggests the feeling of shot embedded within the skin. Later, these papules develop upon the trunk and limbs; and in well-marked cases every portion of the body-surface is invaded, including the palms and soles. The lesions upon the trunk may be surrounded by a narrow, rosy areola. They may be unproductive of subjective sensations or be slightly tender.

As a rule, there is complete defervescence when the exanthem appears, and the patient experiences such relief that if he has chanced not to view his face in a mirror nor been informed of his appearance by those in attendance upon him, he often will regard himself as completely relieved of his three days' illness. In other cases the febrile symptoms persist with a lowered temperature.

During the first two days of the eruptive period the papules increase in number and become correspondingly agglomerated; while those of earliest appearance become transformed into vesicles containing a translucent serum, the roof-wall of many of them exhibiting an umbilication. This umbilication of the vesicle, though not invariably present, is characteristic, and is slightly different from that observed in bullous and pustular lesions. The central depression is disproportionately large, and about it the yet undistended epidermis is often irregularly puckered or fluted. Even in this period the lapse of a few hours will produce a lactescent appearance in the formerly translucent contents. The mucous surfaces adjacent to the skin may similarly be involved.

From the sixth to the twelfth day the transformation of these lesions into pustules is effected, the process beginning, as in all the metamorphoses of the disease, in the vesicles of greatest age, namely, those on the face and upper portions of the body. The lesions simultaneously enlarge until they are of the size of an average pea. They are surrounded with a distinctly ovoid areola. When fully distended, the centrally placed filament which holds down the roof-wall ruptures, causing the umbilication of the pustules to disappear. The integument upon which they develop becomes visibly tumid. With this process of suppuration is awakened the so-called "secondary fever," a pathological feature evidently not essential to the disease, as it does not occur in mitigated cases. This secondary fever is due to the extensive suppuration occurring in the skin and other organs, and may be symptomatic, sympathetic, or septicemic in character.

¹ Discussion on small-pox before Amer. Derm. Assoc., May, 1901, Jour. Cut. Dis., 1901, xix, p. 484.

PLATE XI



Variola, sixth day of eruption. (Heman Spalding.)

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It thus varies in different cases with the character and severity of the process by which it is excited, being transitory in mild cases, and in others terminating only with death. At this time the patient is usually in a most distressing condition. The skin of the face and of other attacked regions is swollen, thickly covered with pustules, and the features indistinguishable in the tumid and closed lids, the edematous lips, disfigured nostrils, and pus-obstructed mucous outlets. Deglutition becomes painful and often impossible; the saliva flows from the lips; and the mucus from the nares dries with the pus upon the exterior of the visage. The pustules recognized upon the integument are present also in the gastro-intestinal tract. In an autopsy of a patient who has died at this stage of the disease the entire canal from the mouth to the anus, as also the genito-urinary and respiratory passages, may be completely covered with closely agglomerated and well-distended pustules. The career of those within the mouth can readily be studied. In this situation they rapidly lose their epithelial roof-wall by reason of the heat, moisture, and friction to which they are subjected, and then exhibit a reddened and excoriated surface, over which there is re-formation of the epidermal layer. Gangrenous complications are rare. In this condition women who are pregnant frequently abort or miscarry, the fetus exhibiting cutaneous symptoms of the disease.

Between the thirteenth and fourteenth day, desiccation begins, and is usually completed within ten days to a fortnight. The pustules rupture, and the exuded pus dries into yellowish or brownish, rarely blackish, crusts; or the latter are formed by the desiccation of the entire envelope and contents. The pulse usually at the same time diminishes in frequency; and secondary defervescence occurs; the tumefaction of the integument decreases; and at times the peculiarly characteristic and often intolerable fetid odor from the patient is less perceptibly exhaled. In from four to six weeks the course of the disease is completed. The immediate traces of the eruption are purplish and violaceous pigmentations, which slowly disappear. When cicatrices result they are slightly depressed, at first of a dull purplish hue, later dead-white, lustrous, usually symmetrical in disposition, and most distinct upon the surfaces exposed to the light and air, such as the face. Though persistent, they are rendered somewhat less deforming in the progress of years. When closely set together, they produce a characteristic ridged and corded appearance, due to the elevation of narrow bands of unaffected integument between the depressed surfaces of scars. The several departures from the pronounced type of the disease described above present variations differing widely from the most benignant forms. Brief reference only can be made to these variations.

Varioloid.—Varioloid, whether occurring after vaccination or not, is a modified type of variola. With it should be classed all those forms of the disorder occurring in the human subject and described by authors under the titles "wart-pox," "horn-pox," *variola siliquosa*,

miliaris, verrucosa, crystallina, and cornea. In these cases there may be a severe prodromic fever and a scantily developed exanthem; rapid involution of lesions; abortion of the latter in any of their several stages from papule to crust; absence of secondary fever; transmission of the disease in a mild or mitigated form from one individual to another, so that an entire community, vaccinated and unvaccinated alike, may suffer from an epidemic disorder of this moderate grade without the occurrence among them of a single case of typical variola. It is scarcely necessary to add that a patient with varioloid, especially during an epidemic, may transmit to the unprotected a malignant form of the disease.¹

Hemorrhagic Variola (*Black Small-pox, Variola Nigra Maligna*), fortunately rare and confounded in the past with "black measles," is a formidable condition.

The disease is developed in two fairly distinct types: the one purpuric, most often seen in subjects debilitated by alcoholism, by enfeebling maladies in infants, and by the puerperal state in women; the other showing pustular lesions.

When cutaneous hemorrhages occur during the course of small-pox, they do not necessarily indicate that the case is one of so-called varioliform purpura, since these extravasations may be accidents of the pathological process. In this malignant form of the disease, against the ravages of which vaccination often presents but a feeble barrier, the prodromic stage is followed by a deep-purplish redness of the surface, which is characterized by pinhead- to split-pea-sized, firm, closely set, papular lesions, suggesting the occurrence of measles in a peculiarly severe form. The febrile, nervous, and other symptoms of the disease are proportionately intense. Ecchymoses appear upon the conjunctival membrane. Gradually the color of the exanthem, that at first disappeared under pressure, refuses thus to yield and assumes a bluish-black shade. Ecchymotic patches may be intermingled with the papules, rapidly widening the palm-sized and larger areas. The mucous surfaces share in these colors, being also infiltrated with effused blood, and the muco-cutaneous orifices are crust-covered and exhale an extreme fetor. Blood may escape from the bowels, bladder, mouth or vagina. Signs of grave systemic and visceral complications are always present. Vesiculation, pustulation, and the typical transformations of variolous lesions may be present, the blood in most cases becoming extravasated at the base or border of the lesions interspersed with petechiæ. In the few cases observed by us death speedily supervened, either from shock, coma, hemorrhagic infarction of the lungs, or rapid exhaustion. Intermediate forms between hemorrhagic and true variola are described, in which forms the pustules occurring in the variolous type of the

¹ For a consideration of the symptoms and diagnosis of modified small-pox as it has appeared in epidemics, see Welch, *Phila. Med. Jour.*, 1899, iv, p. 973, and paper by Hyde published by Illinois State Board of Health, 1900.

PLATE XII



Variola, tenth day of eruption. (Heman Spalding.)

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disease merely fill with blood, in consequence of accidents possessing a purely local significance.

Confluent Variola.—Confluent variola is another severe form, less malignant, however, than that just described. It is characterized by the intensity of the prodromic fever, which often scarcely abates with the appearance of the exanthem. The latter is developed in deeply implanted, firm papules, closely set together, succeeded by vesicles and pustules, which, as they enlarge, fully occupy the entire surface of the integument, and accomplish a perfect coalescence. In well-marked cases there is scarcely a pinhead-sized area of the entire surface of the body that is not invaded. The tissues become enormously edematous; the deformity of the face renders the features indistinguishable. Hemorrhagic pustules and even patches of a gangrenous pulp may be intermingled with sheets of suppurating surface. Phonation, respiration, and deglutition are impeded proportionately or are subverted absolutely by the tumefaction and supuration of the mucous membranes of the respiratory and gastrointestinal tracts. If the patient survives until the stage of desiccation is reached, the body presents a revolting aspect. A thick brownish or blackish-brown mask envelops the swollen head, trunk, and limbs, and the odor exhaled from the body is intolerably repulsive. All the systemic phenomena are proportionately grave, and are accompanied by one or more of the complications of the malady—pneumonia, pleuro-pneumonia, albuminuria, diarrhea, various motor and sensory paralyses, furuncles, and subcutaneous abscesses. The eyes may suffer from pustular and ulcerative changes in the conjunctiva, cornea, and deeper tissues, with resulting inflammation of every grade up to panophthalmia and consequent loss of vision. Often the patients, with surprising powers of resistance, will survive until extensive sheets of crusts have fallen from the skin-surface, and then perish slowly in a typhoid condition, with low remittent or continuous fever. Every such case does not, however, terminate fatally. Both adults and children may rally from the severest form of confluent variola, and afterward enjoy vigorous health.

Etiology.—Variola is always the result of mediate or immediate contagion. It is a disease both contagious and infectious, being often epidemic, and transmissible from the victims of the disease. It is also artificially inoculable. When transmitted by the latter process, its period of incubation is somewhat shortened, and often its successive manifestations become less formidable. The history of inoculated human variola has received, however, but little attention during late years, since the practice properly has been forbidden by law. The disease is, to a certain extent, transmissible from man to the lower animals, and the reverse. It attacks individuals of both sexes and all ages, including the fetus *in utero*, which may be prematurely born and be macerated, or recently dead and covered with lesions of variola. The disease in the larger cities is decidedly more frequent in winter than in summer, possibly because in the colder

months the opportunities are greater for spread of the contagion in artificially heated dwellings in which numbers of individuals are crowded together. Islanders, long unvisited by an epidemic and unprotected by vaccination, may suffer equally in the summer season.

Pathology.—Many microorganisms have been studied in variola, the most important being those described by Councilman, Magrath, and Brinckerhoff.¹ These observers believe that the peculiar inclusions within the epithelial cells, previously described by Guarneri in 1892, and after him by others, sustain relations to the etiology of the disease.

In the lower layers of the epithelia structureless bodies are seen from 1 to 4 μ in diameter, lying in the intercellular vacuoles, which at first are scarcely larger than the contained bodies. The vacuole, however, increases in size as these bodies become larger, more definitely granular, and more distinctly located. Segmentation of the mass occurs later, with the formation of round bodies about 1 μ in diameter. These intercellular bodies are regarded as living organisms.

When segmentation is completed, small, round, oval, or ring-like bodies appear in the nuclei, which increase in size, acquire a definite structure, and consist of a series of vacuoles around a large central vacuole, one or more appearing at times within a single nucleus.

The intranuclear body is believed to be an advanced stage of the development of the intracellular body, springing from the spore-like elements produced by segmentation of the intracellular body, which pass into the nucleus. The spores formed by its segmentation are probably the "true infecting material of variola." Inoculation of rabbits with the contents of variola pustules has given origin to lesions in which both the intracellular and the intranuclear organisms have been recognized. It is believed by these observers that in smallpox the parasite passes through two cycles, but that in vaccinia the primary cycle alone is traversed. The spore-like body formed in this cycle, when introduced into an unprotected human subject, produces vaccinia. Like other similar discoveries, these bodies have been thought to be cell-degenerations.

Coze, Feltz, Baudoin, Luginbühl, Weigert, Hallier, and Cohn recognized both bacteria and micrococci in the blood of variolous patients. Cohn regards these parasites as instances of a "twin race" of *Micrococcus vaccinae* discovered in vaccine-lymph. The secondary fever of the disease is without question septicemic, and is due to pus-cocci and their toxins.

According to Unna, the main distinction between the vesicle of varicella and that of variola lies in the slow growth of the one and the prompt suppuration which is added to the fibrinoid degeneration of the other. The epithelium of the lower prickle-layer undergoes

¹ Jour. Med. Research, May, 1903, ix, p. 372. See also Funk, Brit. Med. Jour., 1901, i, p. 448, abstr. in Archiv, 1903, lxv, p. 290; Stokes, Bull. Johns Hopkins Hosp., 1903, xiv, p. 214; Sanfelice and Malats, Archiv, 1902, lxii, p. 189; Thompson, Jour. Med. Research, 1903-04, x, p. 71.

PLATE XIII



Variola, thirtieth day of eruption. (Heman Spalding.)

speedily "ballooning colliquation," not only at the apices of the papillæ, but also in the depths of the ridges. A gradual division of the vesicle into an upper and a lower story follows, with a lateral extension of the cavity in the upper prickly-layer, a somewhat characteristic edema, and mitotic proliferation of the semisolid cushion below. The umbilication is produced less by the action of centrally placed epithelia acting as guy-ropes than by the enormous force of the exudation at the periphery, in contrast with the slight activity of the central parts, as a result of which the latter are simply left behind. Gradually there follows a dense collection of plasma-cells in the adventitial sheaths of the blood-vessels. The latter subsequently dilate, and the line of demarcation between the cutis and rete becomes well-nigh indistinguishable on account of the stream of leukocytes thither. Healing begins at a later stage by the formation and gradual contraction of a thin layer of epithelial cells lying close to the connective tissue and extending from all sides beneath the pustule.

Diagnosis.—The difficulty attending the diagnosis of variola, in its prodromic and earliest eruptive stages, from measles is considered in the description of the latter disease. The general demand, indeed, upon the physician for an exact and definite diagnosis of every case before its complete evolution is founded upon an erroneous conception of possibilities, and the sooner this is generally recognized the better. A delay of even a few hours will often verify or remove a suspicion. Fully as much mortification on the part of the physician and damage to the best interests of the patient may result from an error in one direction as in the other. The wisest course in every doubtful case is to admit the doubt and to visit the patient frequently for the purpose of observing the development of the disease until that doubt is removed. Typical cases of variola are recognized with ease from the character of the symptoms presented. Measles and scarlatina resemble variola only during the period in the last-named disease when the variolous rashes are present. The symptoms of diagnostic importance at this period are the presence or absence of fever, of catarrhal symptoms, of lumbar pain, the site of first appearance of lesions, and the duration of the disease. Impetigo, and, in particular, impetigo contagiosa, is a non-febrile, almost never generalized, affection of the face and hands; in point of fact, a finger-nail filth disease. Its particular lesions are relatively few, and not umbilicated. Varicella (chicken-pox) is characterized by the occurrence of the thin-walled, translucent, superficially situated vesicles, first developing on the trunk, later on the face, with a mild fever accompanying instead of preceding the rash. The lesions are never indurated and usually not umbilicated. Accidental and secondary eruptions which may be present are recognized by the history and features of each.¹ Syphilis and acne are always distinguished from variola by the absence of fever and their relative chronicity.

¹ Schamberg, Jour. Cut. Dis., 1903, xxi, p. 215.

Treatment.—The treatment of variola should, in general, be limited to the indications presented in each case. No remedies can be employed which have the least power to abort the disease. Certainly, no specifics are recognized as of value in variola. The patient should be kept in a relatively dark room, with an abundant supply of fresh air of a uniform temperature, and antiseptic solutions should constantly be at hand, into which all the ejecta are received immediately. He should be given ice when this is acceptable to the palate, cool water *ad libitum*, and his strength should sedulously be supported by a liquid animal diet. The body may be sponged or bathed in cool or tepid water as often as is grateful to the patient. In severe cases the immersion of the body in the continuous warm water-bath is followed by brilliant results in hastening the desiccation and fall of the crusts and subsequent repair. A bath of this character given for merely two or three hours in the day is often of great value. Gargles of potassium chlorate, myrrh, honey, or phenol will be found acceptable to the mouth and palate. The constant attention of an efficient nurse, bestowing assiduous care upon the mouth, the skin, and the eyes, may be regarded as an essential part of all sound treatment.

In regard to the prevention of pitting, no measures of a therapeutic character will prevent the occurrence of a distinct cicatrix whenever pus has eroded or otherwise destroyed the integrity of the papillary layer of the corium. Every effort, therefore, should be exerted to prevent extension of the suppurative process to the true skin. The following measures have proven themselves as of practical value: First, the sick-room should be moderately darkened and yet be amply provided with fresh air. Second, a solution of pure sodium hyposulphite should be administered night and day in the dose of from 15 to 20 grains (1–1.3) every three or four hours. Salol,¹ iron, strychnin, quinin, digitalis, and opium are indicated at times. The variolous lesions pursue a milder course under this internal treatment, and in some cases the vesicles even shrivel before pustulation is fairly begun. Third, the skin of the face, after sponging with a weak formalin lotion, should be anointed with a bland, fatty substance, such as vaselin, almond-oil, or fresh lard, and over the unguent may be laid silk-enveloped compresses, dipped in tepid weak solutions of phenol or boric acid, or of thymol. The unguents thus employed are medicated at times with boric acid or phenol, zinc oxid, resorcin, bismuth, sulphur, or other ingredients. The anointing of the surface before the application of the lotion is commonly more grateful to the patient, but the skin may be moistened with the aqueous lotion alone. Here, again, the assiduous attention of the nurse is a matter of importance. The powder of euophen topically is often applied with advantage. The local application of iodine is warmly recommended

¹ Begg, Scot. Med. and Surg. Jour., 1900, p. 222; abstr. Brit. Jour. Derm., 1900, xii, p. 184.

by Schamberg.¹ Rockhill² also found it of value. The edges of the eyelids should daily be anointed with freshly prepared cold-cream salve. Puncture of the cornea may be required for the relief of hypopyon.

Diarrhea and other symptoms of visceral derangement should be relieved by appropriate medication. As a rule, the administration of narcotics for the relief of pain is objectionable. Throughout the course of the disease the strength should be supported by a generous use of animal broths or of milk; in typhoid conditions, a judicious employment of stimulants may be necessary.

The red-light treatment of small-pox devised by Finsen has been tried in a considerable number of cases with excellent results.³

The treatment is based on the principle of excluding the chemically active rays from the skin of the affected patient. For this purpose the subject is placed in a room to which no light is admitted that is not first filtered through red glass or other material that will effectively shut out all the chemical rays. As a control-test, sensitized photographic plates are hung in the room, and if they at any time show the influence of white light the technique is not perfect. Finsen states that "when the patient comes under treatment early enough (before the fourth or fifth day of the disease), suppuration of the vesicles, even in unvaccinated persons and in cases of confluent small-pox, will be avoided, with one exception out of about seventy. . . . Should the patient come under treatment after the fifth day of the disease, it is uncertain whether suppuration can be avoided."

Prognosis.—The prognosis of variola is largely dependent upon the degree of protection conferred by previous vaccination. Independent of vaccination, the age and vigor of the patient, the presence or absence of an epidemic of severe or mild type, the extent of the eruption, and the character of the surroundings of the patient are elements of prime importance. Very young and aged subjects, women pregnant or in the puerperal state, are all unfavorably disposed with respect to the final results. Confluent and hemorrhagic forms of the disease are, naturally, the gravest. Unmitigated variola, under the most favorable circumstances, is one of the greatest scourges of humanity. At the same time, the conscientious physician needs to be impressed with the fact that, under the most discouraging circumstances, the patient, disfigured to the greatest extent by an envelope of blackened crust, and in a state of extreme physical prostration, with many of his bodily functions almost completely suspended, may recover.

¹ *Diseases of the Skin and the Eruptive Fevers*, 1908, p. 424.

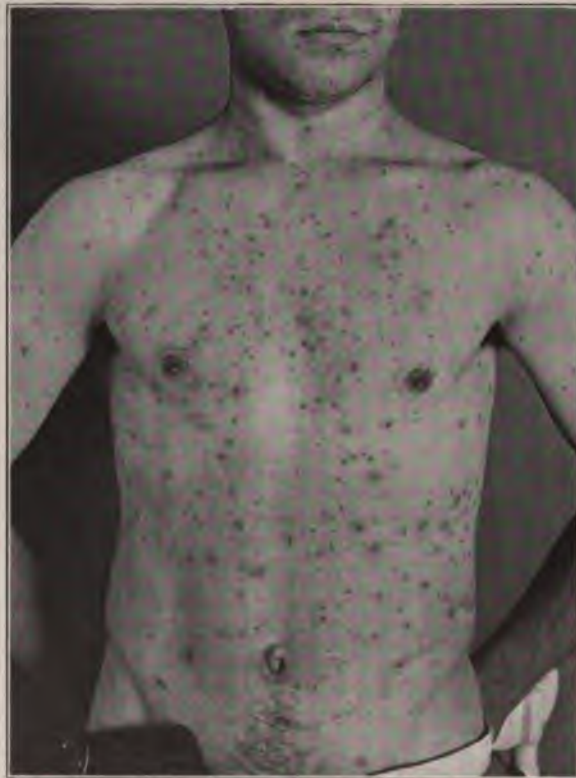
² *Jour. Amer. Med. Assoc.*, January 27, 1912, lviii, p. 273 (Iodin in Small-pox).

³ "Phototherapy," translated from the German by J. H. Sequeira, London, 1901; Brown, *Brit. Med. Jour.*, 1903, ii, p. 1409; Naunyn, *Unterelsässischer Ärzteverein, Sitz.*, 26 Juni, 1903, abstr. in *Münch. med. Wchnschrft.*, 1903, i, p. 1360; Depray, *Jour. méd. de Bruxelles*, 1903, viii, p. 69; Emmerson, *Med. Times and Hosp. Gaz.*, 1903, xxxi, p. 419; Carassa, *Il Morgagni*, i, No. 4, abstr. in *Monatshefte*, 1903, xxxvi, p. 336; *Münch. med. Wchnschrft.*, 1903, i, p. 1810.

Varicella.—**Synonyms:** Chicken-pox. Ger., Spitzblattern, Wasserpocken; Fr., Variolette; Ital., Moroiglione.

Symptoms.—After an incubative period lasting from ten days to a fortnight, the first manifestation of the disease appears. This may be a prodromal erythema, of which Anthony¹ has reported two cases. This eruption is the first evidence of disease; it appears suddenly, is generalized, and resembles scarlet fever, but is less punctate, although usually it is quite distinct. The patient has

FIG. 92



Varicella. (Fordyce.)

watery eyes as in measles, a symptom never seen in scarlet fever. In some cases where the patient is stripped, one or several umbilicated varicella vesicles may be found on the body. The temperature is quite high (104° F.), still the patient does not impress one as being seriously ill. Both the erythema and the temperature disappear in from twenty-four to forty-eight hours and the patient is found to exhibit the typical varicella eruption. The patients are usually children, who may suffer from fever of a moderate grade (99°–100° F.),

¹ Jour. Cut. Dis., 1906. xxiv, p. 68.

lasting from a few hours to two or three days, after which defervescence is commonly complete. With the onset of the fever or even without, the rash appears, first on the head and trunk, in the form of rosy macules or slightly elevated lesions lacking the characteristic "shot-like" feeling of the variolous papule. These lesions rapidly become vesicular, and are pinhead- to pea-sized, rounded or oval, well projected from the surface, limpid, superficial in situation, differently shaped from variolous lesions, and almost never umbilicated, puckered, or "fluted" as in small-pox. The vesicles appear in successive crops, often first over the upper posterior aspect of the trunk, where the typical evolution of the disease is best studied, and then they are surrounded often by a faint pinkish or reddish halo. Their contents become cloudy or lactescent rather than puriform, and they desiccate as early as the second day, forming thin, light, superficial crusts. The lesions may be abundant in one region, as, for example, over the back or the chest, are occasionally both abundant and generalized, and are invariably discrete, never confluent. They rarely occupy the palms and soles; and the vesicular lesions may develop as such, or spring from the macules, the latter, however, not invariably going on to vesiculation. They may occur in crops or simultaneously involve several regions of the surface of the body. They may develop after typical variola.¹ Like variolous lesions, they extend at times to the mucous surfaces of the eyes, the mouth, and the genital regions. Occasionally, they are productive of itching sensations. Often the course of the disease is so mild and the exanthem so slight as scarcely to attract attention. Cicatrices result only in places, chiefly the face, where the lesions have been subjected to local irritation.

Etiology.—The disease is infectious, and if inoculable such a result rarely is obtained. In the large majority of all cases it is a disease of infants and children. Second attacks may occur, but are infrequent. The source of the disease is invariably an infected subject. Adult cases do occur, a number of which we have seen. Schamberg² saw twenty-five cases in eight years.

Pathology.—According to Unna, the varicellous process begins with a "reticulating liquefaction" of some of the prickle-cells of the central and upper portion of the rete, in which the first congestive focus is seen. The complete liquefaction of the contents of the locus is followed by confluence of adjacent cavities and rapid dilatation to the point of formation of a vesicle, the non-liquefied and persistent epithelium being compressed so as to form the septa, while the cells above produce similarly the roof-wall. The epithelial cells of the base, on the other hand, undergo "ballooning colliquation" (transformation of cells into hollow spheres or balloons having the form of peculiar giant-cells), a change affecting especially the centre of the pock, its lateral margins, and even at times its septa. Internally, these ballooned cells merge into simple edematous epithelium with

¹ Schamberg, Phila. Med. Jour., 1902, ix, p. 442.

² Diseases of the Skin and the Eruptive Fevers, 1908, p. 447.

constricted nuclei. Careful observation of the lesions of varicella demonstrates that the vesicles are as distinctly divided into septa as are those of variola. These lesions are never monolocular. Their benign course is explained pathologically by their superficial position, by the absence of purulent infection, and by early repair with young epithelium. The absence of umbilication is explained by the acuity of the process. Bareggi, Guttman, Pfeiffer, and others claim to have discovered micrococci and protozoa both in the blood-corpuscles and in serum obtained from subjects of the disease; but no pathogenic relation of these germs has been established.

Diagnosis.—The doctrine that varicella is a mitigated form of variola has been practically abandoned, in consequence of the researches of pathologists. It is of vast importance that the essential differences between the two diseases be exactly and generally recognized.

In variola the invasion-period of relatively fixed limits, the speedy transformation of the lesions into minute, firm papules, their early appearance on the exposed parts (the face and wrists), the age of the patient, the thermic variations, the prodromic rashes, and the rapid transformation of the papules into umbilicated vesicles, are all important diagnostic points. In varicella the trunk usually exhibits the greater number of lesions, which appear often in successive crops. Thus, at one time the lesions may be seen in all stages of evolution on different parts of the body. Besides the characteristics of the cutaneous lesions, the catarrhal symptoms of measles and the sore-throat of scarlatina will point to the nature of these disorders. Impetigo contagiosa is to be carefully distinguished from varicella, since the two affections occur at times side by side in one hospital ward, and occasionally the former succeeds the latter. The lesions of impetigo contagiosa are often larger, generally more persistent, and the crusts bulkier than in varicella, and the patients rarely exhibit pyrexia symptoms.

In those rare instances where varicella appears in later adult life, an immediate differentiation from variola may be difficult or impossible.

Treatment.—The management of uncomplicated cases of varicella is limited to the avoidance of exposure to sources of aggravation of the affection. Often a dusting-powder may be applied over the surface after a lotion of thin oatmeal-water. Cases complicated by the accidents of exposure or by the intensity of the disease are to be treated by the resources of general medicine, according to the indications presented.¹

Vaccina (*Cow-pox*. Ger., *Kuhpocken*; Fr., *Vaccine*).—The limits of this volume forbid a discussion of the interesting questions concerning the relation of cow-pox, as it occurs spontaneously in the milch cow, to human variola. The fact remains, however, that an attack of cow-pox renders immunity against variola.

¹ Osler, *Modern Medicine*, vol. ii, p. 316.

Vaccination consists in the inoculation of the virus of cow-pox, which produces local lesions, accompanied by general symptoms, and is followed by more or less complete immunity against small-pox. Early vaccination was practised by the so-called arm-to-arm method; now it is chiefly done with glycerinated calf-lymph, the vaccine being kept in hermetically sealed glass tubes, each containing a sufficient amount for one vaccination.

Preparation of the Vaccine.—Calves three to six months old are commonly selected and inoculated with the virus of cow-pox. When the vesicles are well formed, their contents are removed and preserved in glycerin. After the material is obtained, the animal is killed and examined for tuberculosis, a proceeding which precludes the possibility of inoculating tuberculosis with the vaccine.

The cutaneous manifestations occurring with vaccination include the local lesion at the inoculation site, and in addition the occurrence of vesicles, bullæ, and pustules, either locally or more or less generally, all concerned only with vaccine virus *per se*. During the period of development and progress of the process, certain toxic eruptions occasionally occur, such as erythema multiforme, erythema scarlatiniforme, a morbilliform erythema (*roseola vaccinia*, *vaccinola*), urticaria, and rarely purpuric eruptions. As local complications of the vaccination wound should be named impetigo contagiosa, cellulitis, furunculosis, and rarely ulceration and gangrene. General infections, beginning in the infection wound, include pyemia, septicemia, and dermatitis gangrenosa, all of which, fortunately, are rare. As sequels, eczema, psoriasis, pemphigus, and furunculosis may occur. Syphilis, tuberculosis, and lepra are now excluded since the arm-to-arm method has been abandoned.

In the operation of vaccination, strict surgical cleanliness is demanded. A needle properly sterilized, either by passing through an alcohol flame, or placed first in phenol and then in alcohol, is used to scarify the skin.

The skin of the part selected for vaccination being first cleansed antiseptically and subjected to slight tension by the left hand, the vaccinator should scratch or scrape off the epidermis with the needle, held in the right hand, by a series of parallel and crossed strokes, so as to make three or four superficial erosions three inches or more apart. This wound should be the size of the nail of the little finger, and should in no case bleed, but merely ooze with serum slightly tinged with blood. At such points the lymph, preferably extruded by air-pressure from a slender glass tube in which it has been hermetically sealed, is to be rubbed in slowly and thoroughly.

Between the third and the fourth day after a successful vaccination of the unprotected, a light-reddish, pinhead-sized maculo-papule rises at the inoculated point. Between the fifth and sixth day it becomes transformed into a translucent, well-distended, occasionally umbilicated vesicle, which, when single, may attain the size of a finger-nail. Springing from the multiplex abrasions described above, a minute

papule usually forms at each point of intersection of the crossed line produced by the scratching with the needle, and the subsequent vesicles coalesce, thus forming by the sixth day a compound lesion of rather peculiar aspect. It appears often as a small-coin-sized plaque, elevated to the extent of a line or more beyond the general level of the skin-surface, with a rim formed of numerous discrete or confluent vesicles, which in either case are closely set together. The compound plaque seems to develop afterward as a single lesion, its centre being depressed. After the ninth day the fluid becomes opalescent, and desiccates in a reddish-brown crust, which, examined in section in a good light after it is completely dried, exhibits a smooth, homogeneous, shining appearance, with the color of amber. The base of the lesion, single or compound, is usually very distinctly indurated.

Fully as important as any of the metamorphoses of this lesion is its rosy-red areola, in the absence of which it has been held that there is not proper protection. The areola, which endures from about the fifth to the tenth day, completely encircles the compound vesicle in the form of a halo, having a diameter of several inches, the tissue it invades being often slightly tumid. When the pathological process in the focus of this areola is intensified, either as the result of the irritant character of the virus or from extrinsic causes (undue exertion of the vaccinated part), the areola may spread down the arm or over the thigh or leg and eventually cover a dense, brawny, and deeply reddened integument. Dermatitis, erysipelas, lymphangitis, adenopathy, and severe grades of inflammation of the subcutaneous tissues may for similar reasons complicate the process, which may terminate by central sloughing, ulceration, slow repair, and the production of an atypical cicatrix. Ordinarily, the subjective phenomena are limited to a mild or annoying itching of the vaccinated surface; in other cases severe burning pain, a feeling of tension, well-marked adenopathy of the lymphatic glands in the vicinity, and even fever, may be aroused.

The acme of a successful vaccination is usually attained between the tenth and the fourteenth day, after which the symptoms of the disorder gradually subside, the crust falling, if undisturbed, in the course of the ensuing week. When animal virus is employed, the duration of each of these stages of the disease is usually somewhat prolonged.

The cicatrix, at first slightly reddened or pigmented, gradually assumes the dead-white appearance of scars in general. When typical, it is slightly depressed, circular, not irregular nor deformed by ridges, cords, or bands, and "foveolated," exhibiting a series of peripheral pits or depressions, each of which represents the site of a former minute vesicle of simple type. The degree of protection is based in part upon the multiplicity of typical cicatrices.¹

Anomalies of the vaccine-vesicle occasionally are noted as to shape, career, and resulting cicatrix, which are difficult to explain. Thus, the papulo-vesicle may not exhibit an umbilicated centre; or may

¹ Welch-Schamberg, "The Characteristics of Genuine Vaccinia." *St. Louis Med. and Surg. Jour.*, 1902, lxxxii, p. 199.

complete its course within unusually short limits; or a harmless ulceration may progress beneath its crust, requiring a week, or even more, for complete cicatrization. The so-called "raspberry-sore" results from coalescence of small papules, so as to form a pigmented tubercle. The scars resulting from many of these irregular and non-protective results of vaccination usually form atypical cicatrices, being in one case small-palm-sized, deforming, corded, and representative of large tissue-loss; and in another case irregular and inconspicuous.

Lastly, the complications of vaccinia due to external accidents of the lesion are usually inflammatory in character. The excessive use of the vaccinated arm in labor and of the vaccinated leg in walking, standing, and other exertion, may induce, as indicated above, every grade of dermatitis, and even ulcerative changes, in the site of the inoculation, as a result of the intensity of the process. For these accidents rest is essential, with the free use of a dusting-powder over the inflamed surface. In exaggerated cases lotions of lead-water and opium may be employed. These conditions usually are relieved without difficulty as soon as the part is put to rest. The atypical scar which results seems to be in such cases as protective as others, if only the accident have occurred to a typically progressing lesion with distinctly perfect areola. Vaccine-cicatrices are to be distinguished in anomalous situations from maculæ atrophicæ, the scars of syphilis, and those of other scar-leaving disorders.

Generalized Vaccinia.—Occasionally, the vaccine vesicles are spread by autoinoculation over the arms, legs, thighs, hands, and fingers.

A generalized vaccinia not due to autoinoculation is of rare occurrence,¹ and appears, as a rule, from the fourth to the tenth day following vaccination. The lesions occur in crops and pass through the successive stages of the variolous lesion, papule, vesicle, and pustule. They may occur on any part of the cutaneous surface, and are accompanied by systemic disturbance proportionate to the cutaneous involvement and complications. The occurrence of the lesions in crops gives to the exanthem a multiform appearance. The eruptive process subsides in about three weeks.

Vaccinia Hemorrhagica.—This is a term descriptive of a complication of either the vesicle of vaccinia or of lesions surrounding the latter. In these cases there is hemorrhage into the vaccine-vesicle or the development of petechiæ in its neighborhood.

Bullous Dermatitis Following Vaccination.—Bowen² recorded a group of six cases following vaccination in children. The disorder resembled dermatitis herpetiformis. Corlett³ recorded a similar case. All of these ran a benign course. A very different course obtained in a group recorded by Howe.⁴ These were adult cases and terminated fatally (cf. chapter devoted to Pemphigus).

¹ Morrow, Brit. Jour. Derm., 1901, xiii, p. 433; Heidingsfeld, Jour. Cut. Dis., 1902, xx, p. 67.

² Jour. Cut. Dis., 1901, xix, p. 401.

³ Ibid., 1904, xxii, p. 495 (an excellent article on post-vaccinal eruptions).

⁴ Ibid., 1903, xxi, p. 254.

Pathology.—In the vaccine vesicle, according to Unna, the epithelium undergoes ballooning as in variola and varicella, but in the first-named affection the two forms of degeneration, "reticulating colliquation" and "ballooning," are peculiarly commingled. The greater prominence of the ballooning may be due in part to the juvenile character of even the oldest cells. The existence of an inoculation-wound has a marked influence on the microscopical picture, the resulting fissure being filled with blood-disks inside the horny layer, which is somewhat thickened. In vaccinia, as in the two maladies which pathologically it most resembles in its lesions, the formation of the vesicle is by chambers, the septa consisting of collections of cells (granular and others) which seem to be the remains of sweat-pores.

Micrococci have been recognized by Cohn in vaccine-lymph. These have been named *Micrococci vaccinæ*, but their relation to similar organisms discovered in the blood and tissues of variolous patients has not been determined. Wolff¹ claims to have cultivated these organisms through fifteen generations. Strauss demonstrated their existence in the vaccinal pustules of the calf.

Lipp, of Gratz, reported to the International Medical Congress, in London, that he had recognized great similarity between, if not identity of, the micrococci of vaccinia and those of variola that he had cultivated to the second generation, but with which he had then been unsuccessful in producing inoculation-effects. These organisms were always arranged in groups of four or multiples of four.

Steinhaus reports that Unna's ballooning and reticular degenerations play no part in the formation of the pock in animals. The process is, instead, Ziegler's dropsical degeneration with typical mitosis, but without division of the cell-nucleus.

Treatment.—The management of the severer types of vaccinia and of the complications of the disease is to be conducted in accordance with the principles of treatment described in connection with dermatitis venenata, acute eczema, and the disorders simulated by the complications.

ROCKY MOUNTAIN SPOTTED FEVER.²

Synonyms.—Tick Fever of the Rocky Mountains, Piroplasmosis Hominis, Black Fever, Blue Disease, Sheep Camp Fever.

Definition.—The above titles designate an acute infectious disease.

¹ Berlin. Klin. Wochenschr., January 22, 1883.

² Bibliography: Wood, Report, Surg.-Gen. Army, 1896, pp. 60-65. Maxey, Medical Sentinel, 1899, vii, pp. 433-438. Wilson and Chowning, Jour. Amer. Med. Assoc., 1902, xxxix, pp. 131-138; and Jour. Infect. Dis., 1904, i, pp. 31-57. Anderson, Bulletin 14, Hygienic Laboratory of United States Public Health and Marine Hospital Service, 1903. Stiles, *ibid.*, No. 20, 1905. Ricketts, Jour. Amer. Med. Assoc., 1906, xlvii, pp. 33-36, p. 358, and pp. 1067-1069; Jour. Infect. Dis., 1907, iv, pp. 141-153. King, Public Reports, July 27, 1906. Idaho State Medical Association, 1908: Jour. Amer. Med. Assoc., 1908, li, p. 1809 (symposium on Rocky Mountain Spotted (Tick) Fever; papers and discussions by Stewart and Smith, Maxey, Ricketts, Tuttle, Numbers, McCalla, Taylor, Kleinman). Osler's Modern Medicine, vol. iii, pp. 535-540.

accompanied by mild or severe constitutional symptoms, with a cutaneous exanthem having multiform characteristics.

It was first described by Wood, in 1896, and in 1899 by Maxey, since which time many observers have made reports concerning its clinical, pathological, and bacteriological aspects. Unrecorded cases have been noted in some of the regions where it is now prevalent since 1873. The disease is found chiefly in the Rocky Mountains, in the states of Montana, Idaho, Utah, and Oregon.

Symptoms.—The disease is ushered in, as are many infectious processes, with chill or chilly sensations and malaise, followed by a rapid rise of temperature and general soreness over the entire body, especially severe in the back and legs. Headache is common and epistaxis is frequently associated and may be severe during the second week. The tongue is coated and constipation is the rule. The temperature rises suddenly after the onset and remains more or less high, from 100° to 105° or 106° F., for ten to twelve days, when in mild cases it begins to decline, reaching the normal in the third week. The eruption occurs in from three to five days after the onset, beginning on the wrists, ankles, and back, and gradually spreading over the limbs and trunk, including the palms and soles in some cases. Late in the disease it may involve the mucous membrane of the mouth and throat. It appears in crops, like a purpuric toxic erythema, the first lesions being pinkish or reddish macules, which later become darker in color and finally hemorrhagic. In severe cases intense hemorrhagic areas may occupy the entire cutaneous surface. Diffused over the surface there is usually an icteric discoloration in addition to the lesions described. The eruption terminates with desquamation during convalescence. This is most marked on the hands, feet, and face.

With the rise of temperature the pulse rate increases from 110 to 140 in average cases, and the respirations range around 36 per minute. A moderate bronchitis is common and pneumonia is a frequent complication. Nausea and vomiting may occur during the second week and may be intense in severe cases. The spleen is enlarged and tender and the liver shows some increase in size. Hemorrhages may occur from the nose, mouth, stomach, and bowels, and hemorrhagic effusion into the joints has been recorded. The urine is diminished in amount and high colored, and may show traces of albumin and some casts. The nervous manifestations include restlessness, irritability, pain, hyperesthesia, and in severe cases delirium and stupor, while coma usually precedes death. The blood shows a diminution of red cells and hemoglobin. The leukocytes are either normal in number or moderately increased (8000 to 14000), with an increased percentage of the large mononuclears.

Pneumonia, and gangrene of the skin of the terminal extremities, scrotum, and penis, occur as complications.

Etiology and Pathology.—The disease occurs usually during the spring months, from March to July; May and June furnish the major number of cases. It attacks both sexes and may occur at any age.

The infective agent is inoculated, in most instances, by the bite of a tick (*Dermacentor occidentalis*). Several hundred cases occur annually and the virulence varies in different years. In Montana a more severe type of the disease is usually noted. It occurs commonly among people who are closely associated with sheep-herds in the mountains. Ricketts and others have reproduced the disease in animals (monkeys, rabbits, and guinea-pigs). The former also demonstrated the susceptibility to the disease of several animals indigenous to that locality (gopher, ground-hog, chipmunk, rock squirrel, and mountain rat).

The various theories concerning the life history of the micro-organism (as yet not isolated) with its numerous hosts are interesting but cannot be detailed here.

The chief pathological findings, post-mortem, have been noted in the skin, spleen, liver, pancreas, and kidneys.

Treatment.—No specific medication is known and opinion is divided concerning the value of quinin. The general care of the patient, with symptomatic treatment and good nursing, gives best results.

Prognosis.—The average mortality ranges from four to ten per cent.; at times a much higher rate has been recorded. In fatal cases, death usually occurs during the second week of the disease.

CLASS II.

HEMORRHAGES.

PURPURA.

Definition.—Purpura is a condition in which there occur spontaneous hemorrhages in and beneath the skin and mucous membranes. These may vary in size from that of a pinpoint to the palm of the hand or larger. They are smooth, reddish or purplish, non-elevated, usually fairly sharply defined, do not disappear under pressure, and undergo characteristic color-changes, finally disappearing.

Symptoms.—The hemorrhages appear suddenly as bright-red spots, sometimes singly, or as a shower of fine points, as seen in malignant endocarditis. These remain bright-red for a time, but gradually they become dull-red, then bluish, greenish-yellow, dirty-yellow, and finally they fade away; or a temporary or permanent pigmentation may remain. According to their shape, size, and arrangement, the lesions are designated as *petechiæ*, which are pinpoint-to small-coin-sized, usually well-defined macules, sometimes situated about the hair-follicles; *ecchymoses*, which are like petechiæ, except that they are larger and more irregular in shape and in distribution, sometimes covering the entire surface of a limb; and *vibices*, which are linear and band-like arrangements of ecchymoses. Occasionally, the hemorrhage takes the form of bullæ (*bullæ hemorrhagicæ*), or of nut- to egg-sized and even larger tumors (*ecchymomata*). Erythema multiforme, urticaria, and other cutaneous disorders may exist simultaneously. The location of the hemorrhages is usually the extremities, particularly the legs below the knees and the forearms, but the trunk may be involved as well, and, more rarely, the face. The lesions may show a tendency toward symmetrical arrangement. The appearance of the hemorrhage is usually unaccompanied by subjective sensations, but there may be a twinge of pain, followed by a temporary tenderness. The classification of purpura is difficult, and in the absence of more exact knowledge must be of necessity provisional. That there is an idiopathic or primary purpura seems unlikely. A most careful search in such cases would probably reveal an infectious or toxic agent.

Symptomatic Purpura.—(1) *Infectious*: Hemorrhages may occur in the course of any acute infectious disease, but in septicemia, pyemia, and septic endocarditis they are always present and may be very abundant. They are more common in variola than in any other of the exanthemata. Epidemic cerebrospinal fever derives its names, "spotted fever," "malignant purpuric fever," and "petechial fever," from the frequent occurrence of a hemorrhagic eruption. Purpura

may take the place of rose-spots in typhoid. In typhus fever or in Rocky Mountain spotted fever, the eruption is always purpuric.

2. *Toxic*: A number of drugs may cause the appearance of purpura. Chloral, the salicylates, copaiba, and, in persons with an idiosyncrasy, a comparatively small dose of the iodids, may lead to an extensive purpuric rash. Chief among the toxins is snake-venom, which has been frequently made use of in experimental work. Benzol and diphtheritic toxin have been used by Duke¹ extensively in the study of the relation of blood-platelets to hemorrhage.

3. *Cachectic*: Hemorrhages about the distal portions of the extremities are very common in the cachexia of the chronic diseases, as in the anemias, the leukemias, Hodgkins' disease, tuberculosis, malignant tumors, chronic alcoholism in senility, and other disturbances of nutrition. In a series of one hundred cases of acute infectious diarrhea in children, Rolleston and Malony² observed eleven cases of purpura, located chiefly on the abdomen. It appeared about the thirty-fourth day of the disease and preceded death by one day.

4. *Neurotic*: Purpura may occur both in the organic and functional diseases of the nervous system. In tabes, following the lightning pains over the area where the latter has been most intense; in acute transverse myelitis; in insular sclerosis; in hemiplegia on the affected side; and in the neuralgias, hemorrhage sometimes appears. Among the causative factors functional in nature are fright, hysteria, the menstrual state, and stigmatization, in which bleeding points appear upon the unbroken skin.

5. *Mechanical*: Examples of this appear often after the paroxysms of cough in pertussis, and after the seizure in epilepsy. The application of a tight bandage may lead to a hemorrhagic rash. Stasis in dependent parts is a factor, as shown by the disappearance of the purpura during rest in bed and its reappearance on moving about.

Purpura Simplex.—This type is characterized by the appearance of petechiæ in crops, usually upon the legs. Ordinarily, the rash is the only symptom, but there may be associated with it malaise, slight elevation of temperature, mild joint-pains, and gastro-intestinal disturbance. It is seen most commonly in children, and usually lasts from a few days to a few weeks, but it may become chronic or may recur at varying intervals.

Purpura (Peliosis) Rheumatica (Schönlein's Disease).—The difference between this and purpura simplex is probably one of degree only. In this the joint-pains are more marked, and the purpuric lesions are interspersed with or develop into urticarial wheals, forming *purpura urtican*. It may be associated with erythema exudativum. In rare cases vesicles may be formed, giving origin to the term "pemphigoid purpura." The onset is marked by a sharp rise in temperature, and is usually preceded by tonsillitis, whereby the infectious organism gains entrance. Acute nephritis and pancarditis may complicate the attack. Recurrence at the same season may take place for years.

¹ Archiv Int. Med., 1912, x, p. 445.

² Purpura in Infectious Diarrhea of Children, Lancet, 1911, p. 1552.

A similar complexus of symptoms, which seems to be a variant of purpura rheumatica, has been given the name of "Henoch's purpura." In this the erythema multiforme aspect of the cutaneous lesions may overshadow those of the purpuric type. It is chronic, extending over years' duration. Relapses may occur, or the disease may be constantly present. The slightest trauma, escaping even the patient's attention, may lead to subcutaneous hemorrhage. Epistaxis may occur at frequent intervals. Joint-pain and swelling may vary in intensity. Gastro-intestinal crises, associated with pain, vomiting, and diarrhea, occur and have been not infrequently mistaken for appendicitis. One patient, a young woman, was on the operating table and would have suffered a laparotomy had it not been for the timely warning given the surgeon by the writer. Nephritis, usually hemorrhagic, is of frequent occurrence, and the most common cause of death. According to Lippmann,¹ an interstitial nephritis usually results. In some cases uremia supervenes.

Under the term *purpura hemorrhagica*, also known as *morbus maculosus Werlhoffii*, or "land scurvy," are described cases which may have a gradual onset of small petechiæ, with slight constitutional disturbance, gradually developing into large subcutaneous and mucous-membrane hemorrhages. Anemia is rapid, or the disease may have a sudden onset, with the formation of enormous ecchymomata, followed by death in twenty-four hours (*purpura fulminans*).

Etiology.—Purpura may appear at any age, but purpura simplex is said to be more common during the second and fourth decades. Males and females appear to be equally attacked. That it is the result of increase in fragility or permeability of the vessel-walls hardly seems plausible, in view of the fact that in chloroform poisoning, which decreases the fibrinogen of the blood, and after peptone injections, with a consequent increase in antithrombin, the hemorrhages appear soon after the alteration in the blood occurs, and disappear with a return of the blood to normal. In some cases purpura appears only after slight trauma, which in a normal skin would cause no damage. The frequency of the bleeding in the buccal mucous membrane is probably to be explained by the trauma of the food and the action of bacteria on the delicate capillaries. Normally, there is constant repair of capillaries going on, but with a blood-stream altered by toxic or infectious agents this becomes impossible, and subcutaneous and submucous hemorrhages result. That there is an altered coagulability of the blood in all cases of purpura is fairly certain. The ordinary clinical method of drawing blood through a puncture in the lobe of the ear is of little value for the determination of the coagulation time, inasmuch as the tissue juices may neutralize the excess of antithrombin, and for this reason many cases of purpura with normal coagulation time are reported. Whipple² has shown that

¹ Ueber hemorrhagische Nephritis bei Purpura. Deutsch. med. Woch., 1912, xxx, p. 1407.

² II. Hemorrhagic Disease: Antithrombin and Prothrombin Factors. Archiv Int. Med., 1913, xii, p. 637.

in purpura and hemorrhagic diseases the delicate antithrombin-prothrombin balance in the blood is disturbed, either temporarily or permanently, by disease. Under experimental conditions, the preservation of this balance may necessitate rapid neutralization of antithrombin excess, or a rapid production of antithrombin or prothrombin. The prothrombin factor seems to be rarely involved, but when it drops to zero hemorrhages may occur. The antithrombin factor is frequently involved, and with an excess purpuric or hemorrhagic symptoms result. Experimentally, this factor can be increased by stimulation of the liver with peptone injections. Diseases of the blood-forming organs (aplastic anemia, leukemia) lead to an excess of antithrombin, possibly by the action of the products of cell-disintegration on the liver.

Duke¹ has shown that the appearance of purpuric symptoms is marked by a sharp fall in the number of the blood-platelets, and by a rise with their disappearance. He was able to produce similar conditions by injections of benzol and diphtheritic toxin. No account, however, was taken of the other constituents of the blood. Inasmuch as the platelets are decreased in destruction of leukocytes, and antithrombin increased, it may be that fall in the platelet count is but incidental and not an etiological factor.

Howell² failed to find alterations in the constituents of the blood of three cases of purpura, and Cowell³ was unable to produce purpura with benzol, nor was he able to demonstrate any decrease in blood-platelets.

Treatment.—Absolute rest in bed in a horizontal position is of prime importance. No extremity should be dependent. A long list of remedies has been in use, no one of which, with the exception of the calcium salts, appears to have a scientific basis. As shown by Whipple, calcium has no value except in rare cases of hemorrhage with icterus, in which the calcium has become firmly bound with the bile-pigments. A careful analysis of the blood drawn from a vein into oxalate should be made. Blood-serum, either homologous or foreign, or, better, direct transfusion, is of great value in cases with low or absent prothrombin, but is of no value, and may be harmful, in the presence of excessive antithrombin. For the latter condition there is at present no adequate remedy.

Careful and repeated blood-cultures should be made in all cases and a search instituted for a possible focus of infection, as the tonsil, teeth, or appendix, which should be removed at the earliest possible moment if the source of infecting organisms. Autogenous vaccines from such a focus should be tried.

Crocker pinned his faith to oil of turpentine. Some writers advise quinin, iron, ergot, and adrenalin. External treatment is rarely called for, except in those cases in which the hemorrhagic areas break down, forming ulcers.

¹ Pathogenesis of Purpura, with Reference to Blood-platelets. *Archiv Int. Med.* x, p. 445.

² *Ibid.*, January, 1914.

³ *Brit. Med. Jour.*, 1912, p. 1089.

CLASS III.
HYPERTROPHIES.

KERATOSIS PILARIS.

Synonyms.—Keratosis Supra Follicularis (Unna), Lichen Pilaris, Pityriasis Pilaris.

Definition.—Keratosis pilaris is an affection of the skin characterized by the presence of minute horny plugs or papule-like lesions occupying the site of the pilo-sebaceous orifices, and occurring at any age.

Symptoms.—This condition may be a mere temporary functional disturbance of the skin, awakening no subjective sensations, inappreciable by the patient and apparent only to a careful observer; or it may constitute a disease. Morris and Kaposi describe it as a mild form of ichthyosis or xeroderma. The ichthyosis follicularis described by Lesser¹ and MacLeod² probably is a different disease, and is described in the chapter devoted to ichthyosis.

In keratosis pilaris there occur pinhead-sized, pointed elevations of the skin-surface that may be described as papules, though, strictly speaking, they are not such, but are composed of an accumulation of horny epithelia and a small quantity of inspissated sebum about the lanugo hairs of the extensor surfaces of the extremities and trunk. These aggregations of material are usually of a dirty-whitish or grayish hue, and are pierced by a lanugo hair implanted in the follicle about which the abnormal condition exists. Occasionally, however, the hairs are of the finer and shorter kind and are often coiled in or otherwise covered by the little heaps of epithelial débris. The skin of the individual thus affected is generally harsh, squamous, and dry to the touch, suggesting that it has been long unwashed. The color of the lesions differs also with the complexion of the individual, and at times they have a distinctly reddish tinge, and are often surmounted by a scale.

Keratosis pilaris is common in skins long uncleansed by washing, and this condition can thus be produced artificially. In some individuals it persists for long periods of time and awakens no concern. In others, especially in children, it may become the source of itching; and again in still others an exaggerated form of the disease can be recognized in which the skin presents a roughness to the touch suggestive of the surface of a nutmeg-grater, and exhibits numerous fine, conical, grayish, horn-tipped filaments, which have been regarded as a form of ichthyosis. The malady, simple though it be

¹ Ziemssen's Handbook of Skin Diseases, 1885, p. 236 (quoted by MacLeod).

² Brit. Jour. Derm., 1909, xxi, p. 165.

in character at the onset, may be followed by a series of chronic cutaneous disorders. Tilbury Fox has reported four cases in which the disease was well marked, under the title of *Cacotrophia folliculorum*, this name being employed to designate its peculiarities as to wide distribution over the body, its implication of the deeper portion of the follicles, and its congenital history. In these cases the reddish tint of the lesions is shown distinctly.

FIG. 93



Keratosis pilaris. (Fordyce.)

Brocq¹ describes a white variety, in which there occur lesions scattered chiefly over the arms, forearms, legs, and thighs, usually on

¹ Annales, 1890, s. iii, i, pp. 25, 97, and 222 (an extensive review of the subject, with bibliography).

the extensor surfaces. In addition, three inflammatory types are described: (a) a mild form, in which reddish papules are disseminated among those of the white class; (b) a form of medium intensity, in which the papules are generally rosy-red in hue; (c) an intense form, in which well-marked lesions occur over the surface of the chest, the lumbar and pubic regions, and the folds of the larger articulations.

Keratosis pilaris of the face, as described by French writers, is characterized by exceedingly minute, usually conical, occasionally obtuse, papules, each pierced by a fine hair, that develop over the brow, about the eyebrows, over the cheeks, and in the inframaxillary region.

Etiology.—Puberty and uncleanness have been assigned as causes of the disorder. The disease is seen frequently in persons having peculiarly thick, coarse, usually dark-colored skins. It may occur at any age, and is seen well marked in ichthyotic subjects.

Pathology.—The papules are produced by a hyperkeratosis about the orifices of the pilo-sebaceous follicles. In some cases the result is an irritation, which produces a mild degree of chronic inflammation of the periglandular tissue. Giovannini¹ found in twenty-five cases that inflammation was not constant, but in some cases was a marked feature. He found that the follicular orifices were much widened and deepened and filled with a horny plug, in which there were coiled often one or more fine hairs. The hyperkeratosis involved not only the follicle, but also the epidermis about it. There was more or less atrophy of the outer root-sheath of the mouth of the follicle, also of the sebaceous glands and of the erectores pilorum. In a few instances, the entire follicle, including the hair-papilla, was destroyed. Unna² and Lemoine³ regard the condition as inflammatory in origin and primarily involving the follicles.

Diagnosis.—The disease should readily be recognized by the peculiarities of its seat, its course, and the nature of its symptoms. From ichthyosis it can be distinguished by the limitation of its lesions to the orifice of the hair-follicle; from the transitory condition known as "goose-flesh" by its persistence after the surface of the skin is thoroughly warmed; and from papular eczema and the other lichenoid eruptions by the relatively insignificant character of the lesions, their evident follicular origin, and either the entire absence, or mild chronic type, of inflammatory symptoms.

The disease is to be carefully differentiated from pityriasis rubra pilaris, in which the characteristic disorder of the scalp, the appearance of plaques of disease covered with fine pityriasic scales (often upon the tip of the nose and chin), exhibiting a peculiarly dark, smirched appearance, the affection of the nails, the characteristic papules on the dorsal surfaces of the first and second phalanges of the fingers, and the evident admixture of the disease with symptoms of seborrhoeic type, suffice to determine its nature.

¹ Archiv, 1902, lxxiii, p. 163 (with bibliography).

² Histopathology, 1896, p. 287.

³ Annales, 1890, p. 224.

Though the lesions of keratosis pilaris bear little resemblance to the papular syphilodermata, many male patients for years swallow medicaments for relief of a supposed syphilis, the sole "symptom" of which is a keratosis pilaris. The papular syphilodermata are not persistent year after year, are not throughout symmetrical, and are not limited largely to the outer faces of the limbs, especially the thighs. They are preceded by a history of infection, and are accompanied by other manifestations of the disease. They are not limited to the orifices of the hair-follicles, and are not capped by the peculiar horny, scaling tip of the papule of keratosis pilaris.

Treatment.—For the subject of keratosis pilaris in typical form it is not sufficient merely to order a bath. The bathing should be conducted systematically for years at a time. As soon as it can well be tolerated, the patient should be urged to bathe the entire surface of the body every morning by the use of the sponge and cold fresh or salt water, following this with brisk friction with a coarse towel or a flesh-brush. In other cases warm alkaline baths are required. The habitual use of this cold bath continued daily for years, in persons who can tolerate it (and patients affected with keratosis pilaris are usually of this class), accomplishes results of the most satisfactory character, exerting, as it does, a profound influence on the nutrition and healthfulness of the skin.

For immediate treatment of most of these cases, however, the hot bath with soap is desirable. This bath may be repeated as often as required to remove the lesions, and be followed in the more urgent cases by inunction with lanolin pomades or the fats or oils. Salicylic acid, 1 to 10 per cent. in oils or ointments, is effective in removing temporarily the horny accumulations. In the congenital and severe types, such as those described by Fox, cod-liver oil internally should be ordered.

Ulerythema Ophryogenes.—This affection was first described by Taenzer.¹ The disorder is located, or at least usually begins, in the eyebrows, whence it may spread to adjacent parts, including the scalp, or it may appear on the extensor surfaces of the upper arms. In early stages the disease presents many similarities to keratosis pilaris, a form of which disorder it is considered to be by some (Dubreuilh and MacLeod). There usually is present a persistent erythema, with small, elevated, horny papules at the mouths of the hair-follicles. The hairs are finer than normal, and are usually broken off close to the surface. The disorder may persist for years without further change, but in the severer forms superficial inflammation and atrophy, both follicular and interfollicular, may result, so that small, depressed scars are surrounded by or included in the hyperemic areas. The resulting alopecia is permanent and may be marked, especially on the eyebrows.

The disease is said to be rebellious to treatment. Internally, a

¹ Monatshefte, 1889, viii, p. 197 (from Unna's clinic).

ferruginous and arsenical treatment has been adopted, with local applications of resorcin and salicylic acid, the mercurials, and stimulating shampoos with soap.

LICHEN PILARIS SEU SPINULOSUS (CROCKER).

Synonyms.—Lichen Spinulosus (Devergie), Keratosis Follicularis Spinosa (Unna).

Definition.—This disease was first described by Crocker, and cases were shown by Crocker and Colcott Fox¹ before the London Dermatological Society, in 1883. Adamson,² in 1905, described a case clinically and histologically, and reviewed the literature of English and continental cases up to that date. He concludes that the cases described by Hardy and Leloir and Vidal, under the title of *Acné Cornée*, were identical with this disease, and also possibly with that of Guibout. One of Hallopeau's cases, described as *Acné Cornée en Aires*, he also includes; the others he believes were different. In America, the disease has been seldom seen. Bowen³ described a case, and suggested that possibly the disease here has been described under other titles.

Symptoms.—The disorder is essentially one of childhood, though a few examples are recorded in adults, and it occurs more frequently in boys than in girls. It is characterized by the development of minute papules, situated about pilo-sebaceous follicles, each having a projecting horny spine. The lesions are grouped, forming patches, and occur chiefly about the neck, the buttocks, trochanteric regions, the abdomen, thighs, popliteal spaces, and extensor aspects of the arms. The face, hands, and feet are commonly spared. The eruption appears in crops, and a patch may spring up suddenly and continue to enlarge for a week, when it remains stationary, the color gradually becoming paler (Crocker). The arrangement of the patches tends to be symmetrical. There are usually individual discrete papules in addition to those grouped and forming the patches. The horny spines, which are characteristic, protrude about one-sixteenth of an inch above the surface, and present to the hand when passed over the patch the same sensation as though passed over a nutmeg-grater. The lesions early are red in color, but soon assume the color of the normal skin. They may develop acutely or subacutely and may persist indefinitely without treatment. The horny spine may be removed, leaving a depression in the papule.

Filiform spines similar to the above have been described in association with lichen planus, lichen scrofulosus, the miliary papular syphiloderm, and dermatitis seborrhoica.⁴

Etiology.—The cause of the disease is unknown. It occurs chiefly in children, though occasionally adults may be attacked. Adamson¹ suggests a toxic origin.

¹ Quoted from Adamson, Brit. Jour. Derm., 1905, xvii, p. 40.

² Ibid., 1905, xvii, pp. 39-77.

³ Jour. Cut. Dis., 1906, xxiv, p. 416.

⁴ MacLeod, Brit. Jour. Derm., 1908, xx, p. 85.

Pathology.—Adamson² summarizes the microscopic findings as follows: "A horny plug distends the follicle at its upper third and extends upward for some distance beyond the level of the epidermis. It is made up of concentric lamellæ, composed of flattened, welded, horny cells. There is acanthosis of the cell-wall. There is an absence of keratohyalin granules, the horny cells of the plug being formed by a process of irregular cornification. No microorganisms were discovered. The hair-bulb is unaltered, but the sebaceous glands are atrophied or absent. There is a very slight increase in amount of cells of connective-tissue type at the neck of the follicle and in the neighborhood of the papillary vessels." He concludes from these findings that the disease does not differ essentially from other hyperkeratoses of the pilo-sebaceous follicle, and believes Unna's title, "Keratos follicularis spinulosa," better describes the findings. On the other hand, Crocker believes that vascular congestion and inflammation occur first, and that the epidermic changes are sequels. Lewandowsky³ confirms the latter view; but by reason of the suppuration preceding the spine-formation in his case, Adamson excludes it from the category of lichen spinulosus.

Diagnosis.—From keratosis pilaris it is distinguished by the slow development, the absence of redness at all stages, and the diffuseness of the eruption of the latter, and, finally, the removal of the epidermic plug in keratosis pilaris removes the entire lesion. The disease should also be distinguished from other follicular keratotic eruptions.

Treatment.—Crocker had success in using alkaline baths with friction, followed by a liniment of soft soap, spirits of wine, and oil of cade, one drachm to the ounce (4. in 30.). Bowen used oil of cade and salicylic acid in glycerite of starch also with success.

Prognosis.—Without treatment, the lesions may last indefinitely, but soon clear up with appropriate therapeutic measures.

KERATOSIS SENILIS (SENILE KERATOMA).

The condition described by Besnier under the above title might properly be called a preëpitheliomatous keratosis, as true epithelioma often begins in such a lesion. Dubreuilh⁴ described this condition in a paper read before the International Congress of Dermatology, London, 1896, and Hartzell⁵ confirms the clinical description and adds histological findings.

The lesions are seen in people past middle life, more often past sixty years of age, and occur chiefly over the temples and other parts of the face, ears, sides of the neck, and dorsal surfaces of the hands. They are usually flat, moderately elevated, firmly adherent crusts, yellowish-brown or black in color, and when forcibly removed show on their under surface horny prolongations, which fit

¹ Loc. cit.

² Loc. cit.

³ Archiv, 1905, lxxiii, p. 343.

⁴ Annales, 1896, s. iii, vii, p. 1158.

⁵ Jour. Cut. Dis., 1903, xxi, p. 393 (with bibliography).

into the depressions thus disclosed. The surface of the skin is uneven, bleeds readily, is moist and red, and at times superficially ulcerated. The crusts may be greasy, but are usually dry and hard. They commonly present no inflammatory symptoms, but as they are changing their type into true epitheliomata some inflammatory reaction may be noted. In many cases treated by the author several fully developed, deeply situated epitheliomata have been noted as a further stage of the above described condition.

These lesions are often found in association with other changes characteristic of the senile skin, such as atrophy, hyperpigmentation (localized or more or less diffuse), an unusual dryness, with or without scaling, and more or less persistent seborrheic patches.

Pathology.—Hartzell¹ describes hyperkeratosis, especially about the mouths of the hair-follicles and sweat-ducts, with varying degrees of hypertrophy of the rete. In the early stages the corium is but little altered. In a transitional case cellular infiltration was noted in the corium, consisting of mononuclear leukocytes, plasma- and mast-cells, which had surrounded and punctured a down-growth of the rete. The sebaceous glands were found to be normal, but in all cases the coil-glands and ducts were implicated in the pathological process.

Montgomery, D. W.,² made similar findings relative to the implication of the coil-glands and ducts.

Fordyce³ describes the histology of a keratotic patch in a patient sixty years of age, as follows: "The stratum corneum was thickened and showed fairly well-preserved nuclei in its cells; and cornified plugs attached to its under layers distended the mouths of the pilo-sebaceous apparatus. The granular layer was absent, the rete irregular, showing areas of degeneration and vacuolation, the sharp contour of the basal layer being lost. • The connective-tissue in the upper corium was degenerated, presenting a homogeneous appearance. The major portion of the vessel-walls was thickened, and there was a mild inflammatory infiltration in the upper corium." In the study of another case of senile keratoma marked degeneration of the epithelial cells was noted, and the connective tissue immediately beneath, as well as on either side of the area, was degenerated and rarefied. The latter condition is considered important as a factor in tumor-formation.

Sutton,⁴ after a histological study, concludes that seborrheic keratoses should be differentiated into three groups: the keratoid, nevoid, and verrucose types.

Diagnosis.—Lesions such as those described above should be recognized. Physicians, as a rule, attach little importance to them, and many cases are allowed to develop into hopeless epitheliomata before their true nature is recognized. They resemble to a mild degree

¹ Loc. cit.

² Jour. Cut. Dis., 1914, xxxii, p. 6: The Anatomy of a Patch of Seborrheic Keratosis.

³ Transactions of the XVII International Congress of Medicine, London, 1913, Sec. xiii, Part 1, p. 4.

⁴ Jour. Amer. Med. Assoc., 1915, lxiv, p. 403.

the senile or sebaceous wart, but the latter usually occurs over the shoulders and back, and is soft and granular, but practically of the same color. The latter is frequently associated with quite marked itching, and but rarely undergoes malignant change.

Treatment.—In the early stages of this disorder pomades containing from 1 to 3 per cent. of sulphur and salicylic acid or ammoniated mercury may be employed with advantage. Curettage, followed by moderate cauterization, also is effective. The salicylated plaster-mulls and radiotherapy are exceedingly useful remedial measures. The most effective treatment, however, is with solidified carbon-dioxid. This may be moulded to fit the lesion, and as a rule from one to three moderate applications are sufficient to eradicate the disorder.

Prognosis.—The prognosis is to be formulated with due caution in the case of all patients with multiple lesions of the above described type, on account of the malignant change which may take place.

KERATOSIS FOLLICULARIS.¹

Synonyms.—Psorospermiosis, Darier's Disease, Keratosis Vegetans (Crocker). Fr., Psorospermoze folliculaire végétante.

In 1889, Darier in France and White in America, independently, called attention to a cutaneous disorder not previously distinguished from other maladies. On account of the occurrence of peculiar bodies in this disease, described by Darier as being parasites, unusual interest was excited and the disease was studied particularly. More than seventy cases have now been recorded in various parts of the world.

Symptoms.—The disease is characterized by an eruption beginning as papules, which soon become crust covered, and by coalescence produce papillomatous, vegetating, and tumor-like growths. The eruptive manifestations, as a rule, begin about the head and face, and spread over the limbs, the front of the chest, the inguinal and genital regions, and the loins. In one of Bowen's cases the head and hands only were affected.

The early lesions, as described by White and Bowen, are follicular, and are essentially a keratosis of the mouths of follicles. MacLeod² found the major portion of the early lesions in his case to be inter-follicular. They are firm, pinhead-sized papules, scarcely differing in color from the surrounding integument, which later assume a deeper hue, and, whether flattened or spherical, soon become covered with a grayish or brownish crust, greasy to the touch, and apparently prolonged into depressions beneath, much as the crust of seborrhea sicca of the face is sunk within the orifices of the sebaceous follicles. The papules, as they increase in size and become older, acquire a darker hue, until eventually they are a deep-brown and red,

¹ Darier and Thibault, Thèse de Paris, 1889; Annales, July, 1889, x, p. 597. J. C. White, Jour. Cut. Dis., 1889, vii, p. 201, and 1890, viii, p. 13 (histological report by Bowen). Bowen, *ibid.*, 1896, xiv, p. 209 (bibliography), and Annales, 1898, ix, p. 6. Darier, La Pratique Dermatologique, iv, p. 140.

² Brit. Jour. Derm., 1904, xvi, p. 321.

or even purple. Occasionally, scratch-marks and hemorrhagic crusts are interspersed.

Over the scalp, the symptoms are practically those of the crusting forms of seborrhea, save that there is no tendency to loss of hair. Over the face, the parts chiefly involved are the temples, the inside of the concha of the ears, and the folds about the nose and lips. Here, as over the parts of the trunk named above, form dark, even blackish, strata of dirty oil-crusts, spontaneously shed. Over the backs of the hands and fingers the papules and crusts are less numerous, but the papules are closely set together and do not coalesce. In the palms and soles are numerous almost imperceptible lesions of the same type. Palmar keratosis is frequently exhibited to a greater or less degree. Trimble¹ describes keratoderma in four out of five cases.

As the disease advances to what has been described as a second stage, the papules coalesce, forming small, dark-brown tumors and papillomatous growths, which involve not only the follicles but also the interfollicular tissues. Many follicles become the sites of superficial ulcers, while the whole of the vegetating mass is bathed in a more or less abundant, fluid, mucopurulent secretion. The subjects of the malady often emit an offensive odor.

The nails show subungual hyperkeratosis, and the nail-plate exhibits various changes. Small papular lesions have been noted on the mucous membrane in a few cases.

The disease progresses gradually until large portions of the body are covered. Occasionally, exacerbation, with rapidly spreading lesions, occurs, but, as a rule, the course of the affection is slow and the general health of the patient does not seem to suffer, except secondarily from the presence of ulcerating and suppurating lesions of the skin. Bowen² called attention to the fact that no cases had developed malignancy, but since that time Wende³ reported a case terminating in superficial, deep-seated, and papillary epitheliomata.

Etiology.—Little is known definitely regarding the etiology of keratosis follicularis. In the majority of cases recorded the disease began in childhood, and in several cases in early infancy. Of the cases collected, the greater number of patients were males. Heredity is to be considered. White's cases were in father and daughter, Boeck's⁴ in father and two sons. Ehrmann⁵ described the case of a patient whose father he had seen in Janowsky's clinic with the same disorder. Trimble⁶ had five cases in three generations, as follows: mother, three children, and one grandchild.

The theory first advanced by Darier, that the disease was due to the presence of psorosperms, has been abandoned. Bowen first demonstrated the fact that these bodies are cell-transformations and not

¹ Jour. Amer. Med. Assoc., 1912, lix, p. 604.

² Loc. cit.

³ Jour. Cut. Dis., 1908, xxvi, p. 531.

⁴ Archiv, 1891, xxiii, p. 857.

⁵ Verhandl. d. K. K. Gesellschaft d. Aerzte in Wien, October 18, 1901; abstr. Brit. Jour. Derm., 1902, xiv, p. 41.

⁶ Loc. cit.

living organisms. Practically all observers, including Darier, now accept this view.

Pathology.—As originally described by Bowen, the lesions are caused by a hyperkeratosis affecting chiefly the sebaceous and hair-follicles. The process is principally confined to the neck of the follicle, but in the later stages it extends to the interfollicular tissues. The mouths of the pilo-sebaceous ducts are dilated into funnel-shaped openings and are packed with masses of horny cells produced by the hyperkeratosis. Brocq and several other observers believe that the process is not essentially follicular, but that it may begin outside of the ducts. The rete is usually thickened, and in the later stages of the disease the interpapillary processes are elongated. Mitoses are numerous, and in the lower layers of the rete are found fissures or lacunæ, which are believed by Bowen to be caused by fracture occurring between the soft, pliable cells of the lowest rete and the hard, precociously cornified cells immediately above. In places the pressure of the horny masses may produce thinning and atrophy of the rete. About the borders of the lesions there is an abundant pigment deposit in both the epidermis and corium. The only other change noted in the corium is a small amount of cellular infiltration. The glands of the skin are unaltered. In the tumor-like masses and vegetating lesions, marked proliferation of the rete into the corium occurs, this process being secondary, however, to the keratosis. The disease, therefore, is primarily and essentially one of the epidermis.

The round bodies formerly supposed to be psorosperms are found in the deeper and middle layers of the rete, and at the base of the horny plug filling the follicle. According to Bowen, they are swollen cells containing a nucleus which stains deeply, and which is surrounded by a clear or hyaline ring of protoplasm, outside of which is a zone containing granules of keratohyalin, the whole being surrounded by a homogeneous, glistening membrane, which may possess a double contour. Various modifications of this type are found as the result of irregular keratinization of the cells. In the upper layers, in which the process of cornification is advancing, the keratohyalin gradually disappears; but it may do so irregularly, and, losing its granular appearance, may give rise to appearances closely simulating nuclei and nucleoli. In the upper layers, also, the outer membrane may contract or disappear, leaving an empty space. At the bottom of the horny mass in the follicle the stratum granulosum is frequently absent, and there are seen irregular, shrunken, homogeneous cells, with nuclei which stain but feebly. These cells are the "grains" of Darier, and Bowen believes they are cells which have become cornified without passing through the keratohyalin stage.

Diagnosis.—The disease is to be differentiated from *acanthosis nigricans* by the more localized distribution of the lesions in the latter disorder, by their special sites of election (axillæ, groins, about the nipples), by the more frequent occurrence of lesions in the mouth in the latter disorder, and, finally, by the finding of a malignant growth

internally in *acanthosis nigricans*. The disease bears a close resemblance to some forms of *ichthyosis*, but a careful study of the history, the character, and the location of the lesions will usually make the diagnosis clear. From Brooke's *keratosis follicularis contagiosa* it is difficult to distinguish. They both present keratotic lesions, the one usually, the other always, follicular, and both begin in childhood and occur in several members of a family. There is, however, no evidence of contagiousness in Darier's disease.

Treatment.—The treatment is undetermined. Marked improvement may be obtained, but no complete recovery has been reported, and with a lapse in treatment the unfavorable condition of the patient quickly returns.

The parts are to be well cleansed by shampoos and then dusted with borated, salicylated, and absorbent powders. The French, acting upon the parasitic theory of the nature of the affection, vigorously employ parasitocides, salves containing salicylic acid, sulphur, ichthyol, resorcin, pyrogallol, or iodoform, and even resort to cauterization with zinc-chlorid. The use of ointments containing salicylic acid and sulphur is followed by marked improvement. Lieberthal¹ and Mook² found radiotherapy of more value than other methods of treatment. The latter treated four patients by this method.

Prognosis.—The prognosis as to recovery from the disorder is unfavorable, but as to a serious termination of the disease is usually good.

KERATOSIS FOLLICULARIS CONTAGIOSA.

H. G. Brooke³ described under this title a rare and apparently contagious disorder occurring in children and occasionally in adults. He saw six children in one family and three in another affected with the disease, and later saw sporadic cases. Little⁴ presented two cases (sisters) before the London Dermatological Society, a third member of the family also being affected. Elliot⁵ presented a single case before the New York Dermatological Society. Other similar cases are recorded. The exact nosological position of the disease is not known. It appears to be related to *lichen pilaris seu spinulosis* and Darier's disease, differing from these disorders, however, in its apparent contagiousness, and more particularly from the latter in the absence of the so-called *psorosperms*, the characteristic cells of Darier's disease.

The lesions in this disorder are symmetrically disposed over the neck, face, shoulders, and extensor surfaces of the arms, less commonly on other areas. They begin as blackish or yellowish-black macules, which develop into deeply pigmented papules, which have projected from their centres comedo-like plugs and small, spike-like filaments. Interspersed are some larger, fleshy papules, and in addition there occur some lesions appearing like acuminate warts. The

¹ Jour. Amer. Med. Assoc., 1904, xliii, p. 242.

² Jour. Cut. Dis., 1912, xxx, p. 722.

³ Internat. Atlas, 1892, vii, Plate 22.

⁴ Brit. Jour. Derm., 1901, xiii, p. 417.

⁵ Jour. Cut. Dis., 1894, xii, p. 362.

skin in the area is dry, never greasy, and of a dirty shade. The horny excrescences are attached firmly to the tissue beneath. The eruption is widely distributed and shows no signs of grouping of the lesions.

According to Unna, who examined sections of these cases, the pathological changes are due, first, to retention, and, second, to the formation of horny plugs at the site of the follicles. The process is essentially a follicular hyperkeratosis, the latter process extending beyond the region of the follicles.

The nature of the disorder is to progress without treatment, but it is readily relieved by local antiparasitics. Brooke recommended hydrarg. iod. in mollin. The disease has also responded readily to local applications of lard saponified with potassium hydroxid.

KERATODERMIA PALMARIS ET PLANTARIS.

Synonyms.—Symmetrical Keratoderma of the Extremities, Congenital Keratoma of the Palms and Soles, Ichthyosis Palmaris et Plantaris, Tylosis Palmarum et Plantarum. Fr., Kératodermie palmaire et plantaire.

Definition.—Symmetrical keratosis involving the palms and soles may be congenital or acquired. It is characterized by thickening of the horny layer, and varies as to degree and extent. Krost,¹ in 1880, first described the condition, recording cases in four generations. Unna,² in 1883; Hyde,³ in 1887; Dale,⁴ in 1887, and many others have since recorded examples of the disorder.

Symptoms.—The lesions are situated almost exclusively on the palms and soles, though occasionally they may extend over the dorsal surfaces, especially about the joints. Symmetrical involvement of both the palms and soles is the rule, though one or the other may at times be spared. When well developed, there occurs a thick, smooth, yellowish, translucent, dry, hard, horny plate covering the areas above noted. The surface at times, instead of being smooth, may be pitted, and present a worm-eaten appearance; or, as is occasionally seen in the congenital cases, the surface is verrucous and dark-brown or blackish in color. The areas extending over the joints are not so dense and are usually pitted. The palms are uniformly covered, the plate ending abruptly at the margins, usually without areola. The part of the sole not touching the ground in walking is commonly spared.

The acquired cases are usually preceded by hyperidrosis, and often the latter condition is associated with the hyperkeratosis, in which case a sodden epidermis is present, and a pinkish or reddish areola surrounds the horny plate. When fully developed, the arsenical cases are indistinguishable from the above, but early they show indi-

¹ Inaug. Diss., Heidelberg, 1880; quoted by Abraham, Allbutt and Rolleston's System, vol. ix, 1911, London.

² Vierteljahr., 1883, x, p. 231.

³ Med. News, New York, 1887, p. 416.

⁴ Brit. Med. Jour., 1887, ii, p. 718.

PLATE XIV



Palmar Keratosis, due to Arsenic.

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FIG. 94



Keratosis punctata in a man who had been taking arsenic for a long-standing psoriasis.

FIG. 95



Keratoderma palmaris et plantaris hereditaria.

vidual horny or warty projections scattered over the surface, which later, by multiplication in numbers and fusion, produce a diffuse thickening.

The horny plate varies from one-sixteenth to one-eighth of an inch in thickness, and is rigid and inelastic, frequently becoming fissured or broken up into irregular masses. The fissures may extend deeply and involve the corium, inducing painful sensations and interfering with walking. Bassaget¹ describes a mosaic appearance produced by the breaking up of the plate.

FIG. 96



Arsenical keratosis. The illustration shows keratotic patches, similar in type to others situated over the forearms, face, scrotum, and legs, interspersed with hyper-pigmentations and several true epitheliomata. In addition, there occurred a symmetrical keratoderma of the palms and soles. The disease was of 25 years' duration, and due to drinking water charged with arsenic.

Localized and diffuse forms associated with and preceded by erythema have been described by Besnier,² Brooke,³ Dubreuilh,⁴ and Hartzell.⁵ In these cases the keratosis develops on an erythematous base, and further differs from the ordinary types by its ready response to treatment.

In addition to the above types, a hyperkeratosis of the palms and soles may occur (usually in patches, though occasionally more diffuse) as the result of inflammatory processes in diseases such as eczema, psoriasis, syphilis, lichen planus, and pityriasis rubra pilaris, the special characteristics being described in connection with the diseases mentioned.

¹ *Annales*, 1894, v, p. 1356.

² "Keratoderma erythematosa symmetrica," *Internat. Atlas Selt. Hautkrank.*, Heft. ii, 1887.

³ "Erythema Keratodes," *Brit. Jour. Derm.*, 1891, iii, p. 335.

⁴ *Ibid.*, 1892, iv, p. 185.

⁵ *Jour. Cut. Dis.*, 1911, xxix, p. 499.

Localized palmar and plantar keratoses induced by intermittent pressure are described in the chapter devoted to Callosities.

Etiology.—Heredity is an important factor. Some cases are both congenital and hereditary. Vörner¹ reports the disease as occurring in four generations, sixteen out of forty members of the family being affected. Other instances in which the disease occurred in several members of a family in several generations are reported by Brayton, Decroo, Pasini,² White,³ and many others.

In acquired cases, hyperidrosis is a most important etiological factor, and the many causes of the latter disorder are to be sought. In arsenical cases, the cause is obvious, though here, also, hyperidrosis is a factor. In other cases, none of the above factors can be found, and these are explained by some writers as being due to a neurosis.

Pathology.—Vörner states that all the layers of the skin involved are thickened uniformly, and that cornification is normal in type but excessive. He found no evidence of inflammation. Pasini reports very great increase in the number of sebaceous glands. Other observers describe marked elongation of the interpapillary processes, with dilatation of the blood-vessels and the formation of irregular horny masses over the papillæ.

Diagnosis.—The diagnosis of all forms of keratosis of the palms and soles from eczema is to be made chiefly by reason of the absence in the former of well-marked inflammatory symptoms, of vesicles, and of eczematous patches in other regions of the body. Palmar and plantar syphilides are to be distinguished with great caution. These last may be asymmetrical, especially if of "late" type; may exist where there is often a history of infection or signs of lues; and may frequently ulcerate. They have also well-defined circinate borders; and the lesions are more often multiple and isolated.

Treatment.—Internal treatment is preëminently indicated in all the hyperidrosis cases, and should be employed to meet the indications present. Abstention from tobacco, coffee, tea, and alcoholic stimulants is in general demanded. The arsenical cases may be greatly improved by cessation of the medication. Brocq advises the internal administration of sodium arsenate in large doses; but in this connection it should be remembered that cases are reported in which keratosis of the palms and soles has apparently been produced by a long course of arsenic. The local treatment is by prolonged maceration of the parts, followed by shampoos with green soap, in substance or tincture, followed by salicylated pastes, plasters, or solutions of salicylic acid in collodion. Mercurial plasters and mercuric oleates may also be used with advantage. Potassium hydroxid in 10 to 20 per cent. strength has been applied as a lotion to stimulate the surface. Other formulæ recommended are salicylic

¹ Archiv, 1901, lvi, p. 3 (bibliography).

² Giorn. ital., 1902, xxxvii, p. 318 (bibliography).

³ Jour. Cut. Dis., 1912, xxx, p. 276.

acid and calomel, 1 part of each to 20 parts of glycerole of starch; and 1 part each of resorcin, tartaric acid, and salicylic acid to 20 or 30 parts of the salve-basis.

In three cases we have obtained very marked improvement with a few applications of the x-rays. In one congenital case, that of a girl five years of age, a keratosis involving the entire surface of both palms and soles, and so severe as to prevent extension of the fingers and to interfere with walking, disappeared almost entirely after sixteen treatments, during a period of six months. Eighteen months later the keratosis had not returned. Dohi and Mine¹ report marked improvement in the hands, one treated with x-rays, the other with radium, with little or no improvement in the condition of the soles of the same patient treated with salves and plasters.

Prognosis.—In the inherited and congenital cases complete removal of the disorder is accomplished rarely, but by continued treatment the skin can be kept soft and the patient more comfortable. It must not be forgotten that hyperkeratosis of the palms and soles, or of other parts of the body, may terminate in epithelioma.

Mal de Meleda.—Mal de Meleda is an endemic disease occurring on the Island of Meleda in southern Dalmatia. It is a congenital keratosis involving chiefly the palms and soles, but also to a degree other parts. The disease was first described in 1826 by Stulli, and more recently by Hovorka and Ehlers.² As described by the above authors, the disease is characterized by a yellowish, waxy, hyperkeratotic thickening of the skin of the palms and soles; the surface being covered with black dots, representing the orifices of the sweat-glands. There is also an ichthyotic thickening of the skin over the dorsal aspect of the wrists and ankles, and occasionally over the elbows and knees. The upper layers of the epidermis are moist and greasy, and exhale a disagreeable odor. In long-standing cases the sensation is diminished, and the skin assumes the appearance of the bark of a tree. Crocker believes the affection to be in part due to intermarriage in a small community.

KÉRATODERMIE BLENNORRHAGIQUE.

This disorder was originally described by Vidal,³ in 1893, since which time a number of cases have been recognized. Sequeira⁴ was the first to observe the disorder in England, and Simpson⁵ recorded the first case in America. The disease is characterized by the formation of horn-like lesions, discrete or diffuse, affecting special areas, and occurring during the course of an attack of gonorrhea.

¹ Jap. Zeitschr. f. Derm. u. Urolog., 1913, xiii, p. 164.

² Archiv, 1897, xl, p. 251; abstr. Brit. Jour. Derm., 1897, ix, p. 416.

³ Soc. de Derm., January 12, 1893.

⁴ Brit. Jour. Derm., 1910, xxii, p. 139; Little and Douglas, *ibid.*, 1911, xxiii, p. 360 (case report, with nail involvement).

⁵ Jour. Amer. Med. Assoc., 1912, lix, p. 607 (case report, with histology and analysis of the literature); Roark, *ibid.*, 1912, lix, p. 2039 (case report).

Symptoms.—The cutaneous manifestations of the disorder begin during the first few weeks after the beginning of the gonorrheal infection, simultaneously with the joint-complication. Debility and cachexia are commonly noted in these cases, the urethritis being a minor feature. Two types of the disease are described: first, a generalized form, in which the lesions may occur on any part of the body, the extremities, however, being the sites of predilection, the legs and forearms being involved more commonly than the thighs and arms, and the scalp and face being rarely attacked; second, a localized form, involving especially the hands and feet, this being the common type.

The lesions in most areas, except on the palms and soles, occur as isolated, but sometimes confluent, horn-like crusts, varying in size from 0.3 to 2 or 3 cc. in diameter. The smaller ones may be semi-transparent, yellowish, and waxy; the larger, which are formed by agglutination or confluence of the smaller, are of a yellowish-brown hue. Occasionally, vesicles and vesico-pustules precede the above-described lesions. On the palms and soles diffuse thickening occurs, with nodular elevations from the surface. The lesions on the soles are apt to attack the side of the foot, where an arrangement comparable to that of a mountain range on a relief-map is noted. Thick, horny crusts frequently occur beneath the nails, associated with collections of purulent material, which later produce exfoliation of the nail-plate. In Sequeira's case the contour of each foot presented an irregular, horny mass with a nodular surface, the intervening areas being covered with a brownish-yellow, parchment-like, thickened epidermis. The areas occupied by the excrescences were sharply limited by a narrow zone of hyperemia. The nodular masses presented an appearance closely resembling a mountain range on a relief-map, as above described. In Simpson's case a circinate and gyrate configuration was noted. On removal of the excrescences, a moist, pinkish surface is presented. The lesions are superficial, and ulceration does not occur, the sequel being a transient hyperemia or pigmentation. The course of the disease depends upon that of the primary infection, usually subsiding with the subsidence of the disorder. It may recur with recurrence of the latter.

Etiology.—As indicated, the disease occurs only during an attack of gonorrhea, and then with arthritic and other complications. Thus far, the local lesions in the skin have not been found to contain the organism producing the original disorder.

Pathology.—The histological examinations made by various observers agree in the main. The epidermis shows marked thickening. Migrated leukocytes are found in the Malpighian layer, and the interpapillary processes are much elongated. The papillæ are edematous, and show infiltration with plasma-cells, polymorphonuclear leukocytes, and a few eosinophiles. Some observers believe the condition to be a parakeratosis rather than a hyperkeratosis. Gonococci have not been found in the lesions.

Diagnosis.—Recognition of the possibility of the occurrence of keratotic lesions during the course of gonorrheal arthritis makes the differentiation of the disorder simple. It is probable that in the past the lesions have been mistaken for those of syphilis. In certain cases psoriasis has been simulated to a marked degree.

Treatment.—The cutaneous lesions disappear spontaneously with the subsidence of the general infection. In local treatment resorcin and sulphur ointments have been recommended and are of value.

POROKERATOSIS (Mibelli).¹

Synonyms.—Hyperkeratosis Excentrica (Respighi); Keratoderma Excentrica; Hyperkératose figurée centrifuge atrophiante (Respighi).

FIG. 97



Porokeratosis, showing the furrow running along the top of the ridge, and the atrophic appearance of the skin within the encircling ridge. (Douglass W. Montgomery.)

This rare dermatosis was described independently in the same year (1893) by Mibelli and Respighi in Italy. Hutchins, Gilchrist, and Wende were the first to record cases in America. Since that date about two score of patients affected with the disease have been seen in various parts of the world.

¹ Bibliography: Mibelli, *Giorn. ital.*, 1893, iii, p. 313; *idem.*, *Monatshefte*, xvii, p. 417; *idem.*, *Internat. Atlas of Rare Diseases of the Skin*, 1893, xxvi; *idem.*, *Archiv*, 1899, t. xlvii, p. 231 (bibliography to date); *idem.*, *Annales*, 1905, vi, p. 503; Respighi, *Giorn. ital.*, 1893, iii, p. 356; Hutchins, *Jour. Cut. Dis.*, 1896, xiv, p. 373; Gilchrist, *Johns Hopkins Hosp. Bull.*, 1897, lxxiv; *idem.*, *Jour. Cut. Dis.*, 1899, xvii, p. 149; Wende, *ibid.*, 1898, xvi, p. 505; Ducrey and Respighi, *Annales*, 1898, iii, s. ix, pp. 609, 734; Galloway, *Brit. Jour. Derm.*, 1901, xiii, pp. 262, 300; Heidingsfeld, *Jour. Cut. Dis.*, 1905, xxiii, p. 29; Brocq and Pautrier, *Bull. et Soc.*, etc., 1907, iii, s. xxiv, p. 651.

Symptoms.—Porokeratosis is an inherited, chronic, and progressive kerato-atrophoderma, which persists during life. Its elementary lesion is a definitely defined, superficial spot, which is essentially a small keratotic collar, sharply elevated above the general level of the skin like a dike or seam, enclosing a slightly atrophic integument. This dike or limiting wall is in section triangular, having a prismatic outline, with a tortuous contour, producing more or less sharply bordered figures, yellowish-gray or brownish in hue, horny in character, surmounted by a dry, firm, delicate, projecting crust, which seems to spring from a slender furrow running along the summit of the dike, constituted of a spur rising from the horny layer of the epidermis.

The elementary lesion is this minute horny spur, firm, dry, pointed, and springing from the orifice of a cutaneous gland, about which forms the minute collar referred to above, constituted of slender, flat-topped, horny lesions, which may fuse. As gradual extension of the disk ensues, the central portion becomes progressively depressed. Where the skin is delicate and covered with lanugo hairs (buttocks, thighs, and legs), the skin of the enclosed area presents only a smooth, slightly atrophic appearance, the lanugo hairs being generally absent. Keratosis in these parts is represented chiefly by the dike or wall; there may be, however, minute projecting horny lesions in the central area, representing the orifices of the cutaneous follicles.

On the backs of the hands, where no irritation has been produced by friction, incidental to the trades and occupations of life, the hyperkeratosis is much more pronounced and the collarette larger, firmer, and more elevated than elsewhere, while the central area is remarkable for its dryness.

As the process extends centrifugally, there is persistence until atrophy of the orifices of the pilo-sebaceous pouches and the sweat-pores occurs. Situations where these features are pronounced are: the face, the scrotum, the axillæ, the pubic region, and the hairy scalp.

On the disappearance of the hyperkeratosis, the surface becomes shiny, atrophied in various degrees, and the normal furrows of the skin are somewhat more separated. The hairs are usually (not always) absent, and there is more or less peripheral pigmentation.

In such special regions as the face, for example, where the glands are numerous, the atrophic condition is less distinct, the isolated horny projections often absent, and the peripheral collarette much more slender. The appearance then is that of a delicate atrophy of the skin. In regions where there is external pressure the reverse occurs; for example, over the dorsum of the toes. Here the keratosis is more developed, the atrophy more pronounced. The impression to the eye is then suggestive of a dermato-sclerosis. In the palmar and plantar regions and on the lateral surfaces of the fingers, the appearance produced may be that of a soft corn; but the characteristic collarette suffices to establish the distinction.

Etiology.—The causes of the disease are not known. Eleven cases reported by Gilchrist occurred in four generations of one family. The record of other cases indicates clearly that the disease, or the tendency to it, is inherited, and, as Mibelli points out, often limited to members of a single family.

Inoculation experiments have, with a single exception, been negative. Wende¹ made thirty inoculations, all without result except one. In this, after ten unsuccessful attempts, a lesion was reproduced on the unaffected hand of his patient which clinically and microscopically appeared to be a true lesion of the disease.

Pathology.—The histology of the lesions shows a hyperkeratosis involving the entire area, but accentuated in the raised margin. According to Gilchrist, the hyperkeratosis occurs primarily most frequently around the sweat-pore and intradermic portion of the sweat-duct. The rete in the central area may be markedly decreased in thickness. The corium shows a cellular infiltration beneath the hyperkeratotic area, with dilatation of the blood- and lymph-vessels. In certain cases there occurs dilatation of the whole sweat-apparatus. The hair-follicles and sebaceous glands share in the hyperkeratotic process with the sweat-ducts and pores.

Treatment.—The treatment is unsatisfactory. Electrolysis and excision have been followed by comparatively satisfactory results; though recurrence often takes place, and in most instances the disease persists indefinitely.

ANGIOKERATOMA.

Synonyms.—Keratoangioma, Lymphangiectasis (Colcott Fox). Fr., Angiokératome, Télangiectasie verruqueuse (Brocq), Verrue télangiectasique (Dubreuilh).

Definition.—Angiokeratoma is a rare disorder characterized by pin-head-sized and larger vascular dilatations, upon which are developed later wart-like elevations. The disease occurs usually on the extremities, particularly the fingers and toes, of individuals subject to chilblains. The affection was early described by Cottle,² Crocker,³ and Colcott Fox,⁴ under different titles. The first histological study was made by Mibelli,⁵ who gave it the name now commonly employed, and his findings were confirmed by Pringle.⁶ The latter reported two cases, with histological study and review of previous cases. Cases have been recorded in America by Zeisler,⁷ Fordyce,⁸ Hyde,⁹ and Sutton.¹⁰

¹ Loc. cit.

² St. George's Hosp. Reports, 1877, ix, p. 758.

³ Diseases of the Skin, 1st ed., p. 512.

⁴ Westminster Hosp. Reports, 1888, p. 125.

⁵ Giorn. ital., fasc. iii, September, 1889; idem., Internat. Atlas of Rare Skin Dis. No. 2, 1889.

⁶ Brit. Jour. Derm., 1891, iii, pp. 237, 282, and 309.

⁷ Trans. Amer. Derm. Assoc., 1893, p. 54.

⁸ Jour. Cut. Dis., 1896, xiv, p. 81.

⁹ Dis. of the Skin, 6th ed., 1901, p. 449.

¹⁰ Jour. Amer. Med. Assoc., July 15, 1911, lvii, p. 189 (clinical and histological study, with references to the literature).

Symptoms.—The lesions usually occur on the fingers and toes, but several instances are on record in which the scrotum and other parts were involved, even to a generalized distribution.¹

The early lesions are pinkish points, which do not entirely disappear on pressure. The characteristic lesions are dull-reddish, purplish, leaden-hued or darker colored nodules, or small tumors, usually having a warty covering, and varying in size from pinhead to split-pea or larger. They may be discrete or closely commingled, forming larger areas. Under the diascop, much of the color may be removed, but there remains in the centre a deep-red point. The vascular dilatations may be demonstrated even in those lesions which have assumed a distinctly warty character. The globoid nodules may be smooth and horny or be roughened and prickly. Scaling does not occur. Occasionally, wart-like vascular tumors of larger size have been seen in association with lesions of the usual type.

The sites of predilection are the dorsal surfaces of the fingers and toes, where the lesions usually develop following pernio. At times the varicosities of the vessels are commingled with spots, nodules, and transitional forms. The arrangement of the lesions is irregular, though at times symmetrical, and they may be grouped, or, on the scrotum, have a linear arrangement.

There are no subjective symptoms, and the affection is regarded as of so little moment by some patients that the lesions have only been recognized when examining the skin for relief of another disease.

Etiology.—The patients are commonly young, but a few cases have been reported in middle-aged subjects. Preceding chilblains is a factor in the young patients with lesions on the hands and feet. Varicocele has been noted in the scrotal cases. Sutton² believes that changes in the elastin, whereby vascular support is lost, is a factor. The disease may occur in more than one member of a family. Hartigan³ records its occurrence in two sisters; Pringle⁴ in four members of one family, in three of whom tuberculosis was present. The coexistence of tuberculosis is also reported by Frohwein⁵ and others. Dore⁶ recorded a case associated with *erythème induratum* (Bazin), in which, however, a typical chilblain circulation was present. The connection, if any, between the disease and tuberculosis is not clear. Audry⁷ believes the tuberculous hypothesis untenable, and thinks the disorder not rare; he claims to have seen sixty to eighty cases. Scheuer⁸ believes that the disease is due to an hereditary weakness of the capillaries, which in time leads to acroparesis.

Pathology.—All observers agree that the early changes are vascular, and these are succeeded by epidermal hypertrophy. A uniform histological picture is described and shows oval, elongated or irregular lacunar spaces, filled with blood, occupying the papillary region,

¹ Anderson, Brit. Jour. Derm., 1898, x, p. 113.

² Brit. Jour. Derm., 1905, xvii, p. 456.

³ Monatshefte, 1906, xlii, p. 345.

⁴ Brit. Jour. Derm., 1903, xv, p. 323.

⁵ Archiv, 1909, xcviii, p. 251.

⁶ Loc. cit.

⁷ Ibid., 1913, xxv, p. 40.

⁸ Annales, 1910, v, s. i., p. 38.

partly or completely surrounded by the hypertrophied rete, and lined with connective-tissue or epidermal cells. These spaces may be divided into compartments by fibrous septa. Where the circulation has been entirely cut off, the spaces are represented by concentric layers of fibrous tissue, containing blood-corpuscles and pigment. The occurrence of the intraepidermal lacunæ is explained by the supposition that the down-growing rete surrounds and cuts off some of the terminal vascular loops of the papillæ. In the subpapillary region there are dilated blood-vessels, vascular spaces, and a leukocytic infiltration. Sutton describes marked changes in the elastin. The fibers were short, fragmentary, and irregularly arranged, apparently furnishing little support to the vessel-walls.

The epidermis is hypertrophied, and the stratum corneum commonly shows varying degrees of thickening, depending upon the grade of development of the verrucous element. The rete shows marked hypertrophy, especially about the margins of the nodule, where it dips down deeply into the corium. The transitional layers share in the hypertrophic process.

Diagnosis.—Angiokeratoma is to be distinguished from the superficial lymphangiomata by the early age at which the latter appear, by their location, and by the pseudo-vesiculation which they exhibit, as also by the contents of the lesions. Verrucæ vulgares occur as simple hyperkeratoses, uncomplicated with vascular dilatation, and are not preceded by or associated with chilblains.

Treatment.—The lesions may be removed by electrolysis or galvanothermo cautery. The underlying pernio, if present, should also be appropriately treated.

Prognosis.—The prognosis is favorable, as the lesions may be made to disappear under the treatment above outlined.

ACANTHOSIS NIGRICANS.

Synonyms.—Keratosis Nigricans. Fr., Dystrophie papillaire et pigmentaire.

Pollitzer¹ reported the first case of this disorder, occurring in a patient from Unna's clinic. Janowsky² reported a similar case, at the same time accepting the title given the disease by Pollitzer. On account of its striking characteristics, a number of cases have been reported in different parts of the world. In America, Dyer,³ Wende,⁴ Klotz,⁵ Schalek,⁶ C. J. White,⁷ and a few others have recorded cases.

Definition.—This rare and striking disease is characterized by hyperpigmentation and papillary hypertrophy, and occurs in two distinct types: the juvenile, which is benign; and the adult, which is frequently malignant.

¹ Internat. Atlas for Rare Skin Dis., 1891, Plate 10. ² Ibid., 1891, Plate 11.

³ New Orleans Med. and Surg. Jour., 1898, li, p. 201.

⁴ Quoted by Pollitzer.

⁵ Jour. Cut. Dis., 1911, xxix, p. 436; *ibid.*, 1913, xxxi, p. 306.

⁶ Ibid., 1912, xxx, p. 660.

⁷ Ibid., 1912, xxx, p. 179.

Symptoms.—The lesions in this disorder occur in certain regions of predilection, and are usually symmetrically distributed. The axillæ, the neck, the external genitals, the groins, the face, the inner aspects of the thighs, the flexor surfaces of the elbows and knees, the umbilical region, the perianal region, the backs of the hands, the breasts, the gluteal region, the hypogastrium, the forearms, the perineum, and the eyelids are the regions affected in order of their frequency, according to Pollitzer.¹ Darier states that at times the entire cutaneous surface may be involved.

The color of the patches, when fully developed, is a deep blackish hue, but in some cases shades of yellow and brown are displayed. Often the pigment is somewhat irregularly distributed. The pigmented areas are more or less thickly covered with discrete or agglomerated tubercles, papillomatous growths, or vegetating masses. In

FIG. 98



Acanthosis nigricans. (Heidingsfeld.)

some cases these lesions are so small and thickly set as to produce a mamelonated appearance; in other cases, large, broad, sessile or pedunculated tumors spring from the pigmented patch. The natural furrows of the skin of the affected part are exaggerated. Often freckles, pigmented warts, seborrhoic warts, or pigmented nevi are scattered over the area. The neck may be surrounded by a band of lesions, dark-grayish or blackish in color, and having a warty surface. In the axillæ and about the cruro-genital folds, diffuse warty prominences frequently occur, and are especially well marked. In the mouth there may be painful sensations, and papillary lesions resem-

¹ Jour. Amer. Med. Assoc., October 23, 1909, lxxx, p. 1369. (In this report the author discusses all previously recorded and some unrecorded cases and gives references to the literature.)

bling verruca acuminata have been noted. Condylomatous growths have also been described on the surface of the tongue. Small, discrete, papillary and warty growths have been observed on other parts of the mucous membrane, including the epiglottis and pharynx. In Morris'¹ case masses of small warty growths were found on the vaginal mucous membrane, similar to those seen in the mouth.

Alopecia, complete or partial, of the hairy scalp, and changes in the nails, usually dystrophic in character, may occur.

In the malignant form of the disease the general health of the patient is affected comparatively soon, and toward the end cachexia of grave

FIG. 99



Acanthosis nigricans. (Heidingsfeld.)

portent develops. As a rule, the patient rarely survives longer than two years after the beginning of the cutaneous lesions, the average duration being a little more than a year and a half.

In the benign or juvenile form, pigmentary changes and papillary hypertrophy are present, as above noted, but in a milder degree. In these cases the disorder may remain stationary for a long period of time and the general health be little if at all disturbed.

Etiology.—It is now generally accepted that acanthosis nigricans of the adult type signifies a cancerous involvement of one or more of the viscera. The liver, spleen, and other of the abdominal organs have been found involved. In one instance, Spietschka² reported

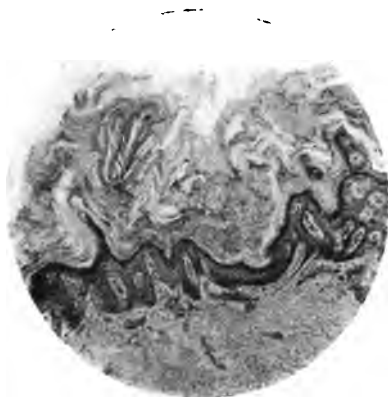
¹ Medico-Chirurgical Trans., 1894, lxxvii, p. 305.

² Archiv, 1898, xlv, p. 247; abstr. Jour. Cut. Dis., 1899, xvii, p. 98.

the recovery of a patient after the removal of a deciduoma malignum. In three instances the disease has occurred with carcinoma of the female breast. In two of these abdominal metastases were present. Recently¹ a case was reported in which the disease was associated with pulmonary carcinoma. In Pollitzer's analysis he concludes that in 80 per cent. of the cases of adult type carcinoma was probably present. This, therefore, is a factor in the etiology of the disorder. The relation of acanthosis nigricans to the malignant visceral disease is difficult to determine. According to some authors, there is an interference with the functions of the abdominal sympathetic (mechanico-nervous theory, Darier), this being a factor in the causation of the cutaneous manifestations.

In the juvenile cases the cause must be sought. In one,² the disease developed following a blow in the epigastrium.

FIG. 100



Acanthosis nigricans. (Heidingsfeld.)

More than half of the patients have been women. Infantile cases occur as early as the second year. Several have been reported as occurring before the fourth year.³ Darier is inclined to the belief that in childhood a teratoma or benign growth may have operated in the manner of a carcinoma of the abdominal region in later life—as an irritant of the great sympathetic, provoking thus the change in the sensitive territory.

Histology and Pathology.—The major portion of the changes are found in the epidermis, in which there are marked hyperplasia of the rete and increase in pigment deposit. In well-marked cases the hypertrophy of the rete resembles that seen in pigmented nevi. The pigment-granules which occupy the palisade-layer are iron-free. The

¹ Petrini de Galatz, *Annales*, 1914, v, p. 321.

² Pawlof, *Monatshefte*, 1902, xxxiv, p. 269 (with references).

³ Cf. White, loc. cit. His case occurred in the fourth year, and he reports several others beginning at an earlier age. He has found, however, no case of malignancy under the age of nineteen years.

granular layer is not implicated, except that in certain cases it may be thin. In the corium marked elongation of the papillæ is noted. A very small amount of perivascular cellular infiltration is present.

Diagnosis.—The disease is to be distinguished from seborrhea nigricans, ichthyosis, keratosis follicularis, arsenical pigmentation, Addison's disease, and xeroderma pigmentosum.

The superficial character of the lesions in seborrhea nigricans, the absence of pigmentation to any degree, and the presence of distinct scaling over the body in ichthyosis, readily rule out these disorders. From keratosis follicularis it is distinguished by the involvement particularly of the mucous membranes and the axillary and inguinal regions, areas which are not frequently attacked by the latter disorder. Intense pigmentation is another feature absent in keratosis follicularis. In arsenical pigmentation, the coloring is likely to be more diffuse and is unaccompanied by the peculiar papillomatous and vegetating lesions found in the disease under consideration. Hyperkeratosis may be present and will assist in the diagnosis. In Addison's disease a pigmentation of the mucous membranes is likely to be present, while the papillomatous and other lesions described in acanthosis nigricans do not occur. In xeroderma pigmentosum the presence of atrophic areas and groups of telangiectatic blood-vessels, hyperkeratoses, and possibly beginning epitheliomata, with the marked photophobia usually present, will readily distinguish this disorder.

Treatment.—The treatment is unsatisfactory. Boeck employed extract of suprarenal capsules. White¹ noted much improvement in his juvenile case under thyroid-extract medication. Local relief may be obtained by the use of salicylated plasters and ointments.

Prognosis.—In juvenile cases persistence of the disorder is the rule, but a fatal termination is not to be expected. In the adult cases associated with abdominal cancer the outlook is grave.

CALLOSITAS.

Synonyms.—Callosity, Keratoma, Tyloma, Tylosis. Ger., Verhärtung.

Definition.—Callosities are acquired, superficial, circumscribed, dirty-white, yellowish-white or darker, flattened, thickened, and horny patches of epidermis, dense in structure, usually insensitive, and occurring for the most part in regions of pressure and friction on the hands and feet.

Symptoms.—Callosities vary in size from that of a finger-nail to that of a section of hen's egg, being at times larger; they occur chiefly upon parts of the integument subjected to long-continued, intermittent pressure, as the hands and feet; also upon parts stretched over osseous prominences, as those over the ischia. Section of a single plaque shows it to be largest at the centre and least at the

¹Loc. cit.

periphery. The lesions are commonly encountered among mechanics, carpenters, and shoemakers; among persons wearing no coverings for the feet or ill-fitting shoes (heel, or ball of foot, or big toes), stockings, or surgical apparatus; among workers in metals, acids, or heated substances; and among musicians (harpists and banjo-players). They are so characteristic of these trades that by their location alone they point, in many cases, to the occupation of the individual who exhibits them; when they are not too large, they are essential to the prosecution of such work. Inflammation may occur in the subjacent tissues and severe dermatitis, lymphangitis, and necrosis result; they may readily serve as foci of cutaneous disease (eczema and psoriasis). They are produced by such external causes as pressure, friction, chemical agents, and heat. They can readily be distinguished from eczematous, psoriatic, and ichthyotic patches, being always limited to the sites of external contact.

Pathology.—The pathological features of callosities are: marked hypertrophy and compaction of the stratum corneum and thickening of the stratum granulosum; the rete mucosum, on the contrary, being thinned by the pressure. The papillæ are often flattened from the same cause. The corium may exhibit signs of inflammation when the callosity has become a source of irritation.

Treatment.—Callosities require treatment only when they are sources of pain or of discomfort. They may be removed, surgically, by the knife; chemically, by the destructive action of acids or alkalis; rationally, by disuse of the part to an extent sufficient to interfere with the operation of the cause. When painful they may be treated with hot fomentations. A nightly soaking of the callus with warm oil, kept in contact with the thickened epidermis during the night by a compress of flannel saturated with the same substance, will eventually soften the induration. Other methods of treatment advised are: the continuous application of a 10 to 25 per cent. salicylic plaster or mull (Stelwagon); the salicylated collodion-paint recommended for corns; and the scraping away of the outer layers of the epidermis with a dull knife, after soaking in a solution of lactic acid, borax, or weak potassium hydroxid solution, protecting the part afterward with zinc-oxid plaster. After softening with the salicylated plaster or with warm borax-water, the lesions may be frozen with carbon-dioxid snow, when occupying small areas.

CLAVUS.

Synonyms.—Corn. Fr., Cor, Œil de Perdrix; Ger., Hühnerauge, Leichdorn.

Definition.—Corns are circumscribed, cone-shaped hypertrophies of the horny layer of the epidermis, presenting inferiorly a prolongation, which, being pressed from without inward upon the sensitive papillæ of the corium, excites pain in various degrees.

Symptoms.—Corns vary in size from that of a pea to that of a large chestnut, and commonly are described as "hard" or "soft." The

former are dense and callous, occurring upon those prominent parts of the foot on which the boot, shoe, or gaiter exercises its greatest pressure. Soft corns develop upon the lateral face of a toe in apposition with another, the lesion originating from pressure through the medium of the neighboring toes. It is softer in consequence of exposure to heat and moisture. Corns are often weather-sensitive, being unusually painful before, during, or after the occurrence of storms. They should not be confounded with gouty or rheumatic deposits below the skin. They are seen occasionally upon the palms of the hands, and when occurring upon the soles of the feet are often the sources of severe distress. They occasionally become infected with pyogenic organisms, leading to suppuration.

Histology.—Corns are composed of superimposed, and often concentrically arranged, layers of epithelium, between which are found at times hemorrhagic extravasations. At the periphery of the corn the corium is unchanged, but at the point where its central cone is pressed into the deeper structures the papillæ are either atrophied or absent. A corn at the periphery exhibits, according to Unna, a thickening of the prickle- and granular-layers. There is a central horny layer, the outermost stratum of which gives evidence of "welding." But the core itself, which is composed of compressed masses of the horny layer conically pointed below, exhibits a flattened ridge-net and papillary body. Often the sweat-pores are preserved, and may be traced running, dilated and with many windings, through the epithelium deeply into the core. The granular layer here disappears, and the general flattening is so great that the margin between the horny cells and the flattened prickle-layer is lost.

Treatment.—Corns, when rationally treated by disuse of the feet, or by the adjustment of properly fitted coverings for the same, will usually fall spontaneously. They are always shed from the feet of the paralyzed. They may be softened by prolonged maceration in water, or by oil, as in the treatment of callosities. Erosion, dissection, and excision may be practised, if demanded by an exigency. Where the sufferer necessarily must continue the use of the foot, the simplest and best treatment is as follows: The part is macerated thoroughly for half an hour with water as hot as can be tolerated. Then the projecting callous portion of the corn is removed by gentle cutting or scraping until, as nearly as may be, the surface is level with the plane of the adjacent skin; after which the part is dried, and the entire surface, both of the seat of the corn and the adjacent integument, is covered completely with many narrow, short, and nicely adjusted strips of rubber-plaster. Burgundy pitch melted and painted over the part may be applied as a substitute for the plaster. When the trifling operation and dressing are complete, the patient should bear firm pressure over the corn without flinching, and walk with comfort. The plaster remains until it separates spontaneously, which is usually in the course of a few days. The corn is then macerated at night with an oil-poultice, as described above, and the dress-

ing afterward reapplied, usually the second time by the patient. Persistence in this course is followed by complete relief, if the coverings of the feet be properly fitted. Carbon-dioxid snow may be employed, as suggested in the management of callosities. Caustics are usually unnecessary when there is no ulceration of the hard corn, and are in this situation frequent sources of great distress. They are chiefly valuable in the treatment of the soft variety, but they should always be applied with a skilled hand. For this purpose acetic acid or the silver-nitrate crayon may be employed. The proprietary "corn-salves" sold in the shops commonly contain the ointment of mercuric nitrate, which also in reduced strength is a useful application to the soft variety of corn. The latter should be protected by the interposition of absorbent cotton or wool from contact with adjacent toes.

As a rule, the ringed corn-plasters sold in the shops are inferior to the dressing with the rubber or salicylated plaster, made to cover the entire corn.

Soft corns occasionally require pencillings with the silver-nitrate crayon after the outer horny layer is removed. Corns may also be removed by the salicylated collodion employed for warts (*q. v.*).

CORNU CUTANEUM.¹

Synonyms.—Cutaneous Horn, Cornu Humanum. Fr., Corne de la Peau; Ger., Hauthorn, Hornauswuchs.

Definition.—Cutaneous horns are rare corneous excrescences, greatly varying in shape and size, often resembling the similar growths in the lower animals.

Symptoms.—Cylindrical, conical, straight or twisted, angular and otherwise, irregularly shaped and sized, corneous eminences, commonly single or more rarely multiple, occasionally project from the scalp, forehead, nose, lips, ears, penis, or extremities. The sites of preference are, in the following order, the scalp, forehead, temples, nose, lower extremities, male genitals, and trunk. Horns are named from their resemblance to the similar appendages in horned cattle, but they differ widely from cattle-horns, which are always implanted upon osseous tissue. Human horns are formed of dense and massed columns of epithelia, often resting upon elongated papillæ. Occasionally, on section, they exhibit the concentric arrangement of the epithelia seen in corns, but, unlike the latter, have reëntrant basal depressions into which the papillæ below penetrate. At times they are implanted in a dilated follicle, in which case the glandular elements participate in their formation. At times, also, they represent a corneous transformation of the epithelia which constitute warts. They are seen in all colors, but are often between a yellowish-brown and a brownish-black, with fissured, wrinkled, or longitudinally

¹ For review of the subject, with bibliography, see Marcuse, *Archiv*, 1902, lx, p. 197; and Pasini, *Giorn. ital.*, 1902, xxxvii, p. 475.

grooved exterior, like rough bark. They may be painless or, like other keratoses, become the seat of inflammation in various grades. They may be short or several inches in length. They may be shed spontaneously, never to return, or may shortly reappear. They occasionally develop into epitheliomata.

Brinton¹ has exhibited an anteriorly curved horn one and seven-eighths inches long and three-eighths of an inch in circumference.

FIG. 101



Cornu cutaneum. (Heidingsfeld.)

removed by him from the glans penis of an elderly patient. Many cases are on record of a similar growth in this situation. In the horn growing from the lower lip of an elderly man exhibited in 1886 at Dr. Hyde's clinic, the growth was longitudinally furrowed, and also at somewhat regular intervals transversely seamed, presenting thus the appearance of the joints of the sugar-cane.

Etiology.—The cause is, without question, that of the senile wart for most cases; though, as with epithelioma, horns occur in infancy. They have been recognized as starting from

a sebaceous cyst. They develop more often after the fortieth year of life, though occurring in infancy, and with slightly greater frequency in women than in men. We have observed a cutaneous horn developing on the upper lip in a lupus vulgaris scar, which later terminated in epithelioma.

Pathology.—Pathologically, these hypertrophies are developed first either within a closed atheromatous cyst or from remarkably elongated papillæ of the corium. They are made up of cornified and hypertrophied epidermal cells. According to Unna, they are all papillary and medullated keratomata growing on a circumscribed, warty base. The first stage of their development is characterized by a simultaneous acanthosis and hyperkeratosis, dense epithelial taps reaching toward the corium. In the second stage of horn-formation, the keratosis advances and the acanthosis diminishes. Sets of horny wedges sink downward into the epithelial taps and ridges, fill the spaces between the papillæ, and are capped above by a horny cupola.

Lebert shows that horns develop into epitheliomata in about 12 per cent. of cases. As horns are really metamorphoses of epidermal cells similar in many features to warts, it is not surprising that the two often undergo the change from benign to malignant epithelial growths. In a few cases horns have developed to an appreciable degree on epitheliomata; but under the microscope this horny meta-

¹ Jour. Cut. Dis., 1887, v, p. 272.

morphosis may be recognized on a smaller scale in a large number of epitheliomata situated on the back of the hands of elderly men who have been farm-laborers, sewer-builders, or workers in contact with earth.

Treatment.—Horns may be removed by extirpation, after softening with alkaline dressings, after which the surface upon which they were implanted should be cauterized thoroughly to prevent return.

Prognosis.—In formulating a prognosis, the possibility of an epitheliomatous sequel should not be forgotten.

VERRUCA.

Synonyms.—Wart. Fr., Verrue; Ger., Warze.

Definition.—Warts are overgrowths of clusters of papillæ of the corium covered with thickened and hypertrophied epidermis, presenting themselves clinically as cutaneous excrescences. They are congenital or develop after birth; are split-pea-sized to many larger dimensions; sessile or pedunculated; pointed or flat; smooth, rugous, or of a cauliflower-like appearance; pigmented in various shades, or the natural color of the skin; soft, dense, or corneous to the touch. They may develop slowly or rapidly, and may persist for years, or disappear without apparent cause. They may be single or multiple, sometimes exceedingly numerous; and occur upon the hands, feet, face, scalp, neck, genitals, and other parts of the body. Usually, they are discrete, but may be confluent and form palm-sized and larger elevated plaques. G. H. Fox, of New York, has reported a case in which warts occurred in the lines tattooed on the skin of a young man.

The several names given to the various forms of warts have chiefly a descriptive value.

Verruca Acuminata¹ (*Condyloma acuminatum*; *Moist or Venereal wart, Fig-wart*. Ger., *Spitzenwarze, Venerische Warze, Feigwarze, Spitzencondylom*) is a filiform, papilliform, or cock's-comb-like vegetation, developing usually on the mucous membranes of the genitals. They are single or multiple; at times hundreds coexist upon the genitalia and neighboring regions. In size they vary from that of a pin's point to that of a hen's egg, and may be larger. They are usually moist and secreting, frequently being covered with a puriform mucus of exceedingly nauseating odor. The secretion at times desiccates so as to cover the lesion with a thin crust. The warts are often the seat of marked itching. They are encountered upon the glans, around the frenum, and over the prepuce of men; and in women about the clitoris, labia, ostium vaginæ, and anus. They are usually of a bright-red color in these situations. When occurring upon the integument, they are firmer, drier, and exhibit a tendency to luxuriant growth. In rare cases they may be recognized about the axillary regions, the

¹ For bibliography, see Joseph, Mraček's Handbuch, iii, p. 425.

umbilicus, the interdigital spaces of the feet, and even the face. They may cover the side of the chin.

The summit of these warts may be tufted, acuminate, or flattish; on the surface of the skin unconnected with mucous membrane, they may have the color of the unaltered integument. They are often minute and numerous as well as multiple and large; or they may be single throughout, though, as a rule, they multiply when untreated. Their largest maximum development is observed on negroes, in whose persons they may attain unusual proportions.

These warts are almost always the result of exposure of the sexual parts to venereal secretions (blennorrhagic, syphilitic, and leucorrhoeal), and, though sometimes observed in virgins, are decidedly rare in individuals of both sexes of that class. In pregnant women they often attain a large size and rapid development, but, as a rule, disappear when parturition is completed. They are contagious and furnish autoinoculable secretions. Cocci and bacilli have been recognized in several varieties, thus explaining many otherwise obscure histories.

Verruca Acquisita.—*Verruca acquisita* is a term used to designate lesions developing after birth.

Verruca Congenita.—This is a linear nevus. They are often noticed first several months after birth, and may be single or multiple, usually the latter, in which case they are arranged in lines. They are, as a rule, roundish, slightly pigmented, and scarcely larger than split peas. (Cf. *Nevus Pigmentosus*, *Nevus Verrucosus*, and *Nevus Unius Lateris*.)

Verruca Digitata.—This is a term descriptive of the form of wart exhibiting finger-like prolongations, separable from base to point. Often each separate filament is horn-capped. They are most frequently seen in the scalp, where one or several variously sized lesions may persist for some time.

Verruca Filiformis.—These warts are pointed growths, soft, slender, thread-like, often pedunculated, usually covered with a smooth and apparently unaltered epidermis. They occur singly or in small groups, upon the face, neck, eyelids, chest, and ears.

Verruca Dorsi Manus et Pedis (Unna).—This is a variety with lesions symmetrically grouped upon the dorsal surfaces of the metacarpi of the thumb and index finger. The lesions are flat, round, or polygonal, two to six millimetres in diameter, externally presenting a punctate appearance. They occur in middle or later life, and exhibit no tendency to spontaneous change. Pathologically, they disclose a distinctive thickening of the prickle-layer from the periphery to the centre. They lack many of the characteristic microscopical features of the ordinary seborrhoeic wart.

Verruca Glabra is distinguished by its smooth surface.

Verruca Necrogenica is a tuberculous wart, occurring on the hands of persons who have been in contact with tubercle-bacilli, chiefly as a result of handling the bodies of the dead. For details, the chapter on Tuberculosis of the Skin should be consulted.

PLATE XV



Congenital Warts.

Verruca Plana¹ (*Verruca Plana Juvenilis*) is a distinct clinical entity. The lesions are flat, smooth, and but slightly elevated. They may be single, but are commonly multiple, and they usually vary in size from that of a pinhead to that of a small split-pea, but may be much larger. They often are grouped, and may have a polygonal outline, closely simulating the papules of lichen planus. In young people these plane warts are usually small, multiple, often grouped, but sometimes occur in lines; they have the color of the normal skin or are slightly yellowish or whitish, occasionally bluish; and are seen most frequently on the forehead, on other parts of the face, on the neck, and on the backs of the hands. In older people this form of wart shows less tendency to

FIG. 102



Verruca plana juvenilis.

grouping than in the young, often is pigmented, and may be associated with or form the beginning of superficial epithelial changes.

Verruca Senilis Vel Plana (*Verruca seborrhoica*, *Keratosis pigmentosa*). These warts are small-pea- to coin-sized and larger, smooth, softish growths developed upon the face, trunk, and extremities of persons of advanced years. They are flat, usually pigmented, and have a granular aspect. They are readily separable by the fingernail, and then are found to rest upon a reddish granular base. As a result of external injury (caustics, traumatism) they may become the starting-point of an epithelioma.

¹ For bibliography, see Joseph, Mraček's Handbuch, iii, p. 518.

Verruca Vulgaris.—*Verruca vulgaris* is the form most frequently seen upon the fingers and hands, as single, multiple, or exceedingly numerous, pinhead- to pea-sized, usually discolored, papilliform excrescences, dense or softish, and rapidly or slowly developed. The top of each is commonly grayish, yellowish, or blackish in tint. Exceptionally, these warts develop on the borders of the lips, in the scalp, the axillæ, and the groins. Warts on the sole of the foot are not uncommon. Here they simulate callosities, only exhibiting their characteristics after removal of the superficial horny material by treatment, when the filiform character is exhibited. The process extends deeply into the corium, the outer margin being usually a rim or collar of keratotic epidermis. The lesion is persistent in its course and causes much discomfort in walking.¹ Hardaway² has directed attention to the frequency with which warty growths, callosities, and hyperidrosis of the feet occur in those suffering from flat-foot and Morton's foot, and the benefit derived from orthopedic treatment. Upon the fingers an exceedingly annoying site is within or upon the nail-folds and beneath the free borders of the nails, situations often affected in several fingers of both hands, especially in young women.

Etiology.—Most warts are nests of microorganisms of different varieties. The precise cause, however, is unknown, but in early childhood, a period in which warts frequently are encountered, it is reasonable to conclude that they result from external contacts. It is when the child begins to handle everything within reach that they usually first appear, and then about the hands. They are probably in a feeble measure both autoinoculable and infectious. Fox, Allen, and Stelwagon have recognized coexistence in one subject of both warts and mollusca. Jadassohn inserted fragments of ordinary warts from four patients in superficial incisions of the epidermis in six different adults. Out of seventy-four inoculations, thirty-three were followed in from two to six months by the development of warty lesions.³ Acuminate or condylomatous warts chiefly occur in parts moistened with a blennorrhagic secretion, but unquestionably they may originate from contact with leucorrhæal or pathological, non-venereal discharges from the female genitals. Senile warts are more probably due to obscure changes in the nutrition of the integument. The etiological importance of the cocci and bacilli found in many warts cannot be determined at this time.

Pathology.—The verrucous process begins with downward and upward growth of the rete-cells, resembling in this respect benign epithelioma. The granular layer is remarkably thickened, while the greatly hypertrophied horny layer is less compact than normal owing to imperfect keratization of the cells, in many of which the nucleus

¹ Dubreuilh, *Annales*, 1895, vi, p. 441; Crocker, 1903, p. 575; Bowen, *Boston Med. and Surg. Jour.*, 1907, clvii, p. 781, and *ibid.*, clxv, p. 937; and Sutton, *Jour. Cut. Dis.*, 1909, xxvii, p. 155, and *Amer. Jour. Med. Sci.*, July, 1912, p. 71.

² *Jour. Cut. Dis.*, 1906, xxiv, p. 127.

³ *Verhand. der v. deutschen. Cong.*, 1896, p. 497 (bibliography).

is still apparent. The descending rete-processes are usually pointed and turn toward a common centre, producing thus a shallow, cup-shaped depression in the cutis.

The papillæ beneath the wart are flattened, all being obliterated, except a few at the centre of the base. These hypertrophy, become elongated, and with their dilated vessels form a vascular "core" for the verruca. In the pointed forms the connective-tissue and vascular elements are marked, while the horny layer is but slightly hypertrophied. In verruca plana the chief change is in the rete, the horny layer being but little thicker than normal.

According to Pollitzer,¹ the seborrhoic wart is characterized histologically by slight thickening of the stratum corneum and considerable hypertrophy of the rete. In the papillary and subpapillary layer of the corium were found epithelioid cells arranged in groups and lines, together with an infiltration of fat affecting the coil-gland epithelium, the middle and papillary layers of the corium, and the epithelium of the rete Malpighii. In verruca acuminata there is little tendency to increased cornification. The rete and papillary bodies are remarkably hypertrophied, and a moderate cellular infiltration is present in the corium.

Diagnosis.—It is a matter of importance to recognize the fact that many epitheliomas begin as warts; therefore, the verruca of those advanced in years should always be examined and treated with this fact in mind. A tendency, especially in the aged, for the lesion to break down into an ulcer should arouse suspicion. Warts on the face and the back of the hands of the aged are often of this class.

Another class of warts are tuberculous in character, and, whether occurring in the young or the aged, are the result of infection with tubercle-bacilli, a generalized tuberculosis at times originating in these lesions (*vide Tuberculosis verrucosa*).

Great care must be taken to distinguish the moist variety of wart from syphilitic condylomata. In the latter there is usually a history of contagion, with other syphilodermata upon the surface, such as mucous patches, palmar lesions, or papules on the face. Fibroma, or molluscum fibrosum, generally occurs in tumors of greater number, firmer consistence, and larger size. The tumor of molluscum epitheliale greatly resembles a wart, but the waxy-whitish appearance of the lesion and its dark punctum at one plane or another sufficiently distinguish it. In exceptional cases verruca plana may in shape and grouping closely simulate lichen planus, but the location and history, together with the absence of the typical color, of the varnished appearance, and of the itching characteristic of lichen planus, will make the diagnosis clear.

Treatment.—Müller, Pullin, Sympson, Herxheimer², and Stelwagon³ have found arsenic of value. We have seen the plane lesions of the

¹ Brit. Jour. Derm., 1890, ii, p. 199.

² Quoted by Crocker, Dis. of the Skin, 3rd ed., p. 580.

³ Dis. of the Skin, 7th ed., p. 555.

juvenile form respond to this treatment. Crocker found magnesium sulphate, recommended by Colrat, given in small dosage three times daily, of value. Nitrohydrochloric acid, thyroid extract, and other remedial agents have been suggested. Warts may be removed by excision, erosion, or caustics (silver nitrate, alkalies, acids, ferric chlorid, and corrosive sublimate). The larger growths upon the genitalia, that are often highly vascular, may demand the prior application of a ligature if they are pedunculated. Even the slender filiform warts will be found to contain a small vessel in each pedicle that demands cauterization after excision. Ordinary venereal warts require scrupulous cleanliness, deodorization with chlorinated soda, and afterward dusting with calomel or with powders of inert material (fuller's earth, lycopodium, talc) containing 10 per cent. of salicylic acid, alum, or tannin. When warts cannot more readily be removed by the knife or by curved scissors, the Paquelin cautery may be used. The blackened eschar which is left prevents hemorrhage, serves as the best subsequent dressing, and is less likely to be followed by a return of the growth. In some cases it is a useful expedient to transfix the lesion in several directions with the long needles used in gynecological practice, previously dipped in a 50 per cent. solution of chromic acid.

One may also transfix the base of the wart a sufficient number of times with a needle connected with the negative pole of a galvanic battery, the positive pole being connected with the body of the patient by the aid of a moist sponge.

The formula according to which are made several of the proprietary "wart-cures" sold in the shops is as follows:

R—Acid. salicylic,	3ss;	2	33 M.
Extr. cannabis indic.,	gr. v;		
Collodii,	3ss;	15	

Sig.—To be painted over the wart with a camel's-hair brush.

For small multiple warts Morris recommends the following:

R—Sulphur. precipit.,	3j;	4	6 10 M.
Glycerini,	3jss;		
Acid. acetic. dil.,	3ijss;		

For patches of warts Van Harlingen recommends cautiously attacking one part at a time with the following paste:

R—Pulv. arsenic trioxid,	gr. vj;	40	M.
Ung. hydrarg.,			
Emplast. hydrarg.,	āā q.s. ad 3ij;	āā q.s. ad 8	

Glacial acetic acid, phenol, nitric acid, chromic acid, caustic potash, zinc-chlorid—in fact, the entire list of caustics—have been successfully used in these destructive applications.

Nitric acid is not infrequently followed by keloidal growths and is not recommended.

Warts may also be treated by painting once daily with a saturated

solution of potassium bichromate in boiling water. The liquid is applied cold. The application is painless and leaves no scar (Louvel-Dulongpre). Seborrhic warts usually are treated with shampoos and cinnabar and sulphur pastes, 1 part of the first, 20 of the second, and 50 of paste. Here, again, carbon-dioxid snow is of value. In several cases in our care of numerous and grouped verruca plana in young adults and children, rubbing the lesions daily with Vleminckx's solution was followed by their complete disappearance in two weeks.

For warts not requiring operative removal local treatment generally answers well. Those about the genital region often disappear if persistently washed with a solution of tannin in alcohol, 1 drachm (4.) to 3 ounces (90.), after which they are dried and thoroughly dusted with boric acid, or salicylic acid with lycopodium, or burnt alum and resin, or, what is most popular, calomel. Alum- and lead-lotions may also be substituted for the tannin and alcohol, and for a time be kept over the parts on a compress. Formalin gently applied by means of a cotton swab is valuable in verruca acuminata of moderate development. Carbon-dioxid snow and radiotherapy are both valuable at times.

Prognosis.—Warts are benignant growths; in childhood and in early adult life they need not suggest grave sequels. It is far different in advanced years, for, though these excrescences possess even then no malignant character, they are frequent precursors of epithelioma. While it may justly be urged that the early lesions in such cases were really epitheliomatous and not verrucous, the fact remains that many warty formations of apparently benign character do, in advanced years, especially when irritated by frequent caustic applications, undergo a cancerous metamorphosis. The tuberculous wart also may become the source of general tuberculous infection.

Synovial Lesions of the Skin.—These cutaneous lesions possess importance from a diagnostic point of view. We have observed them in several individuals in whom the exact nature of the disorder had not been understood. They occur in the form of wart-like projections from the skin, pseudo-vesicles, and bullæ, always over the site of bursæ connected with tendons traversing the small articulations of the hand and foot. They are seen over the metatarso-phalangeal articulations; and in the hand most frequently over the dorsal face of the articulation between the distal and adjacent phalanges of the index-finger and thumb. The first form is that of a roundish, corneous, pea-sized wart, with a yellowish centre, of long duration, usually insensitive unless roughly handled; or the lesion may be smooth, bluish-red in color, and present pseudo-fluctuation. Others are globoid or conical elevations covered with crusts. When punctured, a syrupy, yellowish, or grumous fluid exudes, which continues to form after repeated puncture; this being the most characteristic feature of the disorder. Subjective symptoms occur chiefly when the contents of the cystic cavity produce distention. Pain of different character then ensues, which is relieved by partial or complete evacuation of the sac.

Treatment.—Surgical removal may be practised, though recurrence frequently happens. We have treated several patients successfully with *x*-rays, and one with electrolysis. Lingenfelter¹ had success with *x*-rays.

NEVUS PIGMENTOSUS.²

Synonyms.—Pigmentary Mole, Nevus Spilus. Ger., Fleckenmal, Linsenmal; Fr., Tache Pigmentaire.

FIG. 103



Nevus lipomatodes. (B. F. Lounsbury.)
(Patient seen in consultation and photographed by the author.)

Definition.—According to Unna, nevi may be described as circumscribed, small malformations of the skin, which have an hereditary basis, or have their foundations laid in embryonic life, become evident at different periods of life, develop very slowly, and are distinguished by their color or the form of their surface.

Congenital vascular nevi are described in the chapter devoted to the Angiomata. The nevi to be described here vary according to

¹ Jour. Cut. Dis., 1913, xxxi, p. 647.

² For studies of the different forms of nevi and full bibliographies, see Möller, Archiv, 1902, lxii, pp. 55 and 371; and Riecke, *ibid.*, 1903, lxx, p. 65.

the structure of the skin chiefly involved. In different cases the pigment, the hairs, the sebaceous glands and the sweat-glands are particularly involved; in others, different layers of the skin are attacked, producing the many varieties seen.

Moles.—Moles may be either pigmented or free from pigment. Pigmentary moles are circumscribed accumulations of pigment in the skin, developing with or without other tegumentary alterations.

These abnormal congenital pigmentations of the skin vary in color from a light-yellow or chocolate-brown to a blackish hue, and they may be single, or be multiple and very numerous. They vary

FIG. 104



Nevus pilaris et pigmentosus.

in size from that of a pinhead to that of the palm of the hand, and are flat, oval, or circular in contour; occasionally, they are so irregularly shaped as to present a fanciful resemblance to lower animals, whence the popular belief as to their origin in maternal impressions. They usually appear during the first year of life, but may be delayed until puberty or later. During the first few years they gradually increase in size, with no elevation. At puberty they begin to project from the cutaneous surface. They occur in both sexes, and in all regions of the skin, but especially upon the face, neck, trunk, thighs, buttocks, and external genitals.

The term *Nevus spilus* is applied to those pigmentations which occur

in a smooth and otherwise unaltered skin, these in later life sometimes becoming mammillated and presenting a growth of poorly developed hair; *Nevus pilosus*, to those surmounted by a growth of shorter or longer, stiff or downy, dark- or light-colored hair; *Nevus verrucosus*, to those which are warty, soft or hard, furrowed or smooth, accompanied by hypertrophy of the papillæ, and often presenting a growth of hair; *Nevus papillomatosus*, to that variety covered with soft papillary

FIG. 105



Nevus linearis.

growths, this variety having frequently an offensive secretion; *Nevus lipomatodes*, to that variety in which both fatty tumors and diffuse fatty infiltrations occur as congenital defects in association with nevi of other varieties. A remarkable case of this type was described by Hyde¹. Other cases have been described by Jackson,² Howard Fox,³ Little,⁴ and others.

¹ Jour. Cut. Dis., 1885, iii, p. 193 (literature).

² Ibid., 1895, xiii, p. 66.

³ Ibid., 1912, xxx, p. 484.

⁴ Brit. Jour. Derm., 1910, xxii, p. 388.

The so-called "white moles" are similar to the above, except that the pigmentation is slight or apparently wanting. In certain cases these may become extensive, and have a corrugated, cerebelliform surface (Crocker).

Nevi of the above types may be symmetrically or asymmetrically developed upon the surface of the body.

FIG. 106



Nevus unius lateralis.

Linear Nevus (*Nevus unius lateralis*, *Nevus verrucosus*, *Nevus neurosus*, *Ichthyosis cornea*, *Ichthyosis linearis neuropathica*, *Papilloma neuropathicum unilaterale*).—Linear nevi may be presented clinically merely as hyperpigmentations, or as warty growths arranged in streaks and patches, the latter being the more common variety. In some reported cases the arrangement has simulated that of herpes zoster. In the case reported by Hyde¹ there were multiple monolateral pigmentary nevi distributed over the left side of the trunk, along the

¹ Chicago Med. Jour. and Exam., 1877, xxxv, p. 377.

course of the intercostal nerves, and in such a manner as strongly to suggest their correspondence to the lesions of zoster of the same region. De Amicis¹ had previously reported a somewhat similar case. In this type of nevus the warty growths extend in bands and streaks of varying widths vertically on the extremities and horizontally on the body. The warty excrescences vary in size from that of a millet-seed to a pea or larger, and are brownish or yellowish-brown or blackish in color, hard, and, when occurring in patches, are frequently fissured. Streaks and curves of pigmentation may be associated with these. In certain other cases the entire lesion consists only of hypertrophy of the pigmentary elements of the skin.

FIG. 107



Nevus pigmentosus (unilateral distribution).

Instead of being warty, the lesions may be papular, and in certain instances strongly resemble those of lichen planus. Dore² recorded a case in which the lesions resembled those of lichen ruber monilliformis. In a few instances, acneiform lesions have occurred in association with linear nevi, presenting comedone-like lesions projecting from the mouths of follicles. In Selhort's³ case folliculitis and perifolliculitis, producing ulcers followed by scar-formation, occurred. Thibierge,⁴ Davis,⁵ Sequeira,⁶ da Costa,⁷ and others have reported cases of this

¹ *Lo Sperimentale*, 1876.

² *Ibid.*, 1896, viii, p. 419.

³ *Brit. Jour. Derm.*, 1910, xxii, p. 130; *ibid.*, p. 266.

⁴ *Ibid.*, 1912, xxiv, p. 76.

⁵ *Brit. Jour. Derm.*, 1910, xxii, p. 165.

⁶ *Annales*, 1896, s. iii, vii, p. 1298.

⁷ *Abstr. Brit. Jour. Derm.*, 1897, ix, p. 207.

type. In Davis' case the black dots or comedone-like lesions were discovered to be horny plugs in the mouths of spherical crypts.

Occasionally, the mucous membranes are involved. Cases are recorded in which the tongue and other portions of the oral mucosa, the nasal mucous membrane, and the mucous membrane of the vagina have been invaded.¹

Giant Nevus.—Under this heading those nevi which affect extensive areas of the cutaneous surface are grouped. These frequently occupy the so-called "bathing-trunk" region and are described as being of this type.² This affection may involve the entire trunk or a segment of the same.

In certain cases of giant nevus the anomaly in the skin closely resembles the pelt of an animal. Interspersed among the pigmented and hairy regions verrucous lesions and mammillated patches occur. In a case of this type reported by Anthony³ there were many hundreds of pea- to dollar-sized moles associated with the above type of lesions.

Mixed types occur in which vascular nevi are interspersed. Adamson⁴ recorded a linear nevus with verrucous and vascular lesions, and referred to a Baretta model⁵ described as *vascular nevus verrucosus*. Morris and Dore⁶ described a case with follicular papules, slightly yellowish in color, with dotted, depressed centres, which represents a nevus of the sebaceous-gland type.

In most of the types of nevi above described, gradual progression occurs up to a certain point, at which time the lesions remain stationary for the remainder of the patient's life. In a very few instances, spontaneous disappearance has occurred. In certain other cases, infection with pyogenic organisms has produced destruction of the major portion of the growth. In a case described by Adamson⁷ a sclerosing effect occurred in a pigmented vascular nevus without the intercurrent of secondary infection. In older people there may be a malignant transformation.

Etiology.—Nevi occur in both sexes, either as congenital lesions or developing later in life. In either case they may persist without change, or undergo degenerative transformation at a later period. Many theories have been brought forward to explain the cause of the linear arrangement of the lesions. As summarized by D. W. Montgomery,⁸ these are as follows: The lines follow the course of the cutaneous nerves or of the blood-vessels, or run along what are termed

¹ Hyde, Jour. Cut. Dis., 1909, xxvii, p. 256; Sibley, Brit. Jour. Derm., 1913, xxv, p. 370; Williams, Jour. Cut. Dis., 1912, xxx, p. 36; Sequeira, Brit. Jour. Derm., 1912, xxiv, p. 313.

² Howard Fox, Jour. Amer. Med. Assoc., April 20, 1912, lviii, p. 1190: A case of extensive pigmented and hairy nævus, "bathing-trunk" type, with genital tumors (with review of 25 cases of similar type).

³ Jour. Cut. Dis., 1909, xxvii, p. 471.

⁴ Brit. Jour. Derm., 1910, xxii, p. 263.

⁵ Plate XLIV, p. 259, Baretta model 1772, from the patient of Gaucher, St. Louis Atlas.

⁶ Brit. Jour. Derm., 1912, xxiv, p. 27.

⁷ Ibid., 1911, xxiii, p. 77.

⁸ Jour. Cut. Dis., 1901, xix, p. 455 (with a list of 48 titles under which linear nevus has been described, and references to the literature).

Voigt's boundary lines, or run in the metameres or segments of the body; or, lastly, that they lie along the embryonic sutures, but follow the trend of growth of the tissue.

Pathology.—The histopathology of pigmented moles is characteristic, and the findings are uniform. On account of the frequent development of malignant growths on these lesions, the origin of the nevus cells has been made the subject of much study. Histologically, the epidermis, as a rule, shows but little change; occasionally, when the mole protrudes much above the surface, some hyperkeratosis may be noted, due to irritation, and there is also increased pigment in the basal layer of the rete. Characteristic findings occur in the corium. Parallel rows of oval or cubical cells, having large, oval, vesicular nuclei, pass down deeply into the corium from near the epidermis in a somewhat oblique direction. Between the rows of cells the fibrous elements are lessened, particularly the elastin. In addition to the above-described cells, occasionally a few giant-cells and large cells containing pigment are found.

As to the origin of the cells, von Recklinghausen¹ believed that they were derived from the endothelium of the lymphatics. Green,² Bauer,³ Johnston,⁴ and others confirm this view. Unna, on the other hand, traced their origin to the epidermis. His findings have been corroborated by Gilchrist,⁵ Whitfield,⁶ W. S. Fox,⁷ and others. Fox states that while the major part are of epidermal origin, a few cases may possibly be mesoblastic.

In the other varieties of nevi the histological changes vary according to the structures particularly attacked. In the verrucous type, the histology resembles that of the ordinary wart. In certain linear types, Unna found evidences of inflammation and changes suggesting those seen in eczema. Elliot⁸ found marked changes in connection with the sweat-apparatus, consisting of cystic degeneration in the coils and ducts.

Diagnosis.—The major portion of the nevi above described are readily identified. The only difficulty in diagnosis will lie in the proper differentiation or distinction, if there be one, between the linear nevi of warty type and ichthyosis hystrix. Schalek⁹ maintains that nevus unius lateralis and ichthyosis hystrix are distinct clinical entities, and that in histopathology a differentiation is readily made.

Treatment.—Pigmentary moles may be removed by excision, cauterization, or electrolysis. The last-named method is applicable to the smaller and more superficial growths of this class. Fox¹⁰ calls

¹ Ueber die multiplen Fibrome der Haut, Berlin, 1882.

² Virchow's Archives, 1893, cxxxiv, p. 331.

³ Ibid., cxlii, p. 407.

⁴ Jour. Cut. Dis., 1899, xvii, p. 132 (clinical report by Burnside Foster; histological report by J. C. Johnston).

⁵ Ibid., p. 117.

⁶ Brit. Jour. Derm., 1900, xii, p. 267.

⁷ Ibid., 1906, xviii, pp. 1, 47, 83 (a thorough piece of research work on this subject, with extensive references to the literature).

⁸ Jour. Cut. Dis., 1893, xi, p. 168.

⁹ Ibid., 1908, xxvi, p. 562.

¹⁰ Electricity in Removal of Superfluous Hairs, Etc., Detroit, 1886.

attention, in connection with this subject, to the need of passing the needle no deeper than the epidermis, sufficiently deep merely to "blister the surface of the black spot." The electrolytic removal of hair from hairy moles often results in obliteration of the lesions. In case additional treatment is necessary, the mole may be transfixed in several directions and the current allowed to pass for a few seconds until the area becomes white. After this treatment the lesion gradually dries and forms a superficial crust, which later is exfoliated. The treatment may be repeated in case it is necessary. Carbon-dioxid snow and liquid air are often highly satisfactory. In pigmented and hairy moles, a combination of freezing and radiotherapy for the removal of the more deeply situated hair constitutes a valuable means of treatment. Bunch,¹ in reporting the treatment of three hundred cases of nevi (capillary, cavernous, and pigmentary), reported excellent results with carbon-dioxid snow and liquid air. Radium is advised by Wickham and Degrais² only in hairy and deeply colored prominent tumors. Simpson³ reports the successful management of a pigmented and verrucous nevus with radium.

The technique for the employment of these remedies will be found in the chapter on General Therapeutics.

Prognosis.—The change of a benign into a malignant neoplasm should be borne in mind. Aside from this possibility, the disfigurement occasioned by the blemishes is the only factor to be considered.

ICHTHYOSIS.

Synonyms.—Fish-skin Disease, Xeroderma. Ger., Fischeschuppenauschlag; Fr., Ichtyose.

Definition.—Ichthyosis is a congenital cutaneous disease, characterized by a dry, harsh, and scaling condition of the skin, associated with abnormal cornification.

The disease commonly develops shortly after birth, although in certain cases adult life may be reached before its development, and in certain others it is well developed at birth. For purposes of study, the disease is divided into several varieties: ichthyosis simplex, ichthyosis hystrix, ichthyosis congenita, and ichthyosis follicularis.

Symptoms.—**Ichthyosis Simplex** (*Xerosis*, *Xerodermia*).—The mildest form of the disorder is usually described as xerodermia. The symptoms are purely cutaneous. They prevail in some areas more than others, but at times are universal. The skin of the body is dry, harsh, rough, and destitute of natural moisture and unguent. Closely inspected, the skin-surface is seen to be scaly; the exfoliation is of the character described as furfuraceous, and often inelastic and leathery. In some cases the hand passed briskly over the surface of such a skin will cause separation of scales in a scanty shower. In other cases the

¹ Brit. Med. Jour., February 4, 1911, p. 247.

² Radium Therapy, Paris, 1912, p. 224.

³ Trans. Amer. Med. Assoc., Sec. on Derm., 1913, p. 30.

flakes of the epidermis are attached more or less, and the clothing of the patient is not, as in some forms of psoriasis and other scaling diseases, covered with epidermal scales.

The parts chiefly involved are the extensor surfaces of the extremities, as also the hands, feet, forearms, and legs; but all parts of the skin may be involved, including the scalp, the face, the temples, cheeks, and even the lips.

The disorder is met with in all grades, from the mildest physiological dryness suggestive of "gooseflesh," to that state represented by the skin of the so-called "alligator men." In some cases the xerodermatous papillæ project as in keratosis pilaris. The color of the integument in well-marked cases is of a dirty-yellowish or dirty-brownish shade, suggesting an unwashed condition; and in extreme

FIG. 108



Ichthyosis.

cases, usually those of older persons, the skin becomes rather deeply pigmented. The affection is seen in both sexes and all ages. It is a congenital condition, but the first appearance is indicated clearly only after variable periods of time after birth. The general health is unaffected. Before puberty the affection, in northern latitudes, will often be inappreciable in summer but distinct in winter. As maturity is reached, however, the condition may become permanent.

A child affected with what appears at first to be merely xerosis may exhibit an extreme type of ichthyosis before puberty, while another will go through life with the xerosis of his childhood remaining practically unchanged.

The xerodermatous skin of both children and adults is commonly sensitive to irritating agents, and is often the seat, especially in severe weather, of itching, inflammation, and fissures.

In a grade of ichthyosis more advanced, the scales are massed, forming grayish and whitish polyhedral elevations or plaques, regularly outlined and closely set, especially on the extremities and certain portions of the trunk. It is the regular setting of these horny plates which has given the malady its familiar title of "fish-skin disease." The scalp in almost all cases is dry and scaly, and the hairs, being deprived of nutrition, are dry and lustreless.

The so-called "alligator-skin" represents an extreme condition of cornified integument, inelastic, discolored, and transformed into a cuirass covered with thick plates like those of a saurian.¹ Elsewhere the scaliness described above may be present, but in a more marked

FIG. 109



Ichthyosis.

degree. Variations occur, in consequence of which the plaques, bordered distinctly by the natural lines and furrows of the skin, are depressed centrally or completely; or they may assume darker shades of color, namely, brownish and greenish-brown.

Ichthyosis Hystrix.—This is a term which formerly caused great confusion, owing to the fact that numbers of cases representing different types of nevi were classed under this head. Some authors believe that all cases of ichthyosis hystrix are nevi.² The term is restricted to those cases which present circumscribed patches of spinous excrescences, or patches in which papular or verrucous elements enter into their formation.

¹ Fox, G. H., *Jour. Cut. Dis.*, 1884, ii, p. 97.

² Pernet, *Brit. Jour. Derm.*, 1911, xxiii, p. 332; Sequeira, *ibid.*, 1912, xxiv, p. 313.

As a rule, this disorder occurs independently, but in certain cases this type is associated with ordinary ichthyotic symptoms. Those cases in which distinct warty growths occur in lines, and others of this type, are described in connection with nevi.

FIG. 110



Ichthyosis hystrix.

Ichthyosis Congenita ("*Harlequin fetus*," *Keratosis universalis congenita*).—This exceedingly rare disease occurs as an intra-uterine modification of the skin of the fetus, which is usually brought into the world as a non-viable monstrosity. Cases have been reported in this country by Elliot,¹ Sherwell,² Bowen,³ Cabot,⁴ Winfield,⁵ Annie S. Daniel and Louis Cordes,⁶ Moore and Warfield,⁷ and others.

¹ Jour. Cut. Dis., 1891, ix, p. 20.

² Ibid., 1894, xii, p. 385.

³ Ibid., 1895, xiii, p. 485.

⁴ Medical Record, New York, July 6, 1895, p. 10 (extensive bibliography).

⁵ Jour. Cut. Dis., 1897, xv, p. 516.

⁶ Jour. Amer. Med. Assoc., October 27, 1900, p. 1081 (report of case, with histology).

⁷ Jour. Missouri State Med. Assoc. (commented upon in Jour. Amer. Med. Assoc., April 14, 1906, p. 1130).

There appear to be two varieties of congenital ichthyosis: one practically always fatal, the other frequently terminating in recovery. By many the latter type is not accepted as being a true congenital ichthyosis. In the grave form, the skin is represented by a thick, horny cuirass, deeply furrowed and resembling plates of armor. The large flakes of corneous epidermis, but partially attached to the corium, have broad, free edges. The ears, eyelids, and lips are usually wanting, being replaced by corneous folds, suggesting in appearance the corresponding features of a mummy. The fingers and toes resemble talons and claws. Death commonly occurs in the course of a few days from inability to secure nutrition by the act of sucking and from the imperfect development of other organs than the skin.

Sherwell¹ describes a case of congenital ichthyosis of unusual interest in that at the time of the report the infant had lived to be more than five months old, and seemed to be gaining in strength and improving in the condition of the skin. No history of heredity or of a family tendency to deformities of the skin could be obtained.

In a patient exhibited by the author before the Chicago Dermatological Society in 1908, a congenital malformation of the skin was present, exhibited at birth as a smooth envelope covering the entire cutaneous surface, which has been likened to oiled paper or collodion. After a few days this became broken up into large masses and began to exfoliate, leaving a tender but apparently normal epidermis beneath. Unfortunately, the child contracted an intercurrent disorder and died before the process was complete. Bowen² described a similar case and mentioned others reported elsewhere. He suggests that these cases are due to the persistence of the epitrichial layer of the embryo, which normally is entirely shed before birth, and is in doubt as to whether they should be classified as mild cases of ichthyosis congenita. In contradistinction to the true congenital cases, in those described above the general health is not impaired; and in cases that have survived for any length of time the epidermis merely presents scaling for a longer or shorter period after the shedding of the above described membrane, and later either becomes normal, or develops the symptoms of the ordinary type of ichthyosis.

Ichthyosis Follicularis.—Three cases of peculiar interest were described by MacLeod³ under this title. In the three there were associated baldness, absence of eyebrows and eyelashes, trachoma, and conjunctivitis. The hairy system was chiefly involved. In certain situations the hairs were replaced by pinhead-sized papules, surmounted by horny spines, the papules being uncolored and without areola. While these lesions were generally distributed, they were most marked on the extensor surfaces of the upper arms, back and sides of the neck, and the back. They were irregularly disseminated, but roughly symmetrical. The skin in general was moderately

¹ Loc. cit.

³ Brit. Jour. Derm., 1909, xxi, p. 165.

² Loc. cit.

ichthyotic. There were no subjective symptoms. The lesions began on the face at or before the second year. There were three children thus affected in one family. MacLeod concludes that the cases belonged to the category of ichthyosis, and that, while they presented many features in common with keratosis pilaris, they differed in being non-inflammatory in origin, and therefore the title "ichthyosis follicularis" was the most appropriate one.

Viewing ichthyosis as thus exhibited in various manifestations, it is seen to be a congenital deformity. It may be partial or general, though usually the latter, with intense manifestations over the extremities, especially over the extensor aspects; and relative immunity of the face, the axillæ, the groins, the flexor aspects of the limbs, the palms and soles, the glans penis, and the prepuce. The deformity is rarely visible at birth, but usually becomes apparent before the completion of the first year of life. It is manifested first in the regions of election named above, *i. e.*, over the elbows and the knees; and here it may for some years only be apparent in northern latitudes in winter, disappearing almost wholly in the summer season. When maturity is reached, the deformity has been known to disappear temporarily under the influence of intercurrent disease (variola). One patient is said to have regularly cast a slough of his integument in the autumn. Williams¹ reported the regular shedding of the skin in an ichthyotic patient, with subsequent recurrence of ichthyotic symptoms.

Etiology.—Ichthyosis is unquestionably a congenital condition, though its first manifestations are apparent only during the second year of life. Crocker describes an acquired case in a septuagenarian. It is said to be invariably hereditary, but this should be accepted with some reserve. One ichthyotic patient, married to his cousin, had by her five children free from cutaneous disease. None of his parents or grandparents was affected similarly. The disease occurs equally in both sexes, in all lands, and in persons of all social ranks. It is usually aggravated in cold climates and during the season of winter. The general vigor and development of patients thus deformed are, as a rule, unimpaired, Kaposi says: "The cause appears to be a local anomaly of the nutrition of the skin, especially involving its epidermic and fatty elements."

Thost² describes ichthyosis occurring in four generations. According to the ascertained genealogy, the ancestor first known to have suffered from this affection had five male children who inherited it, while one girl and one boy were spared. One of these affected subjects had five children, of whom three males showed the anomaly, while one boy and one girl remained free. Another subject, of the same generation, had five male and three female children; of these four boys and two girls became affected. One of the latter (third generation) bore four

¹ Brit. Jour. Derm., 1912, xxiv, p. 233.

² Inaug. Diss., Heidelberg, 1880; Centralb. f. Chir., 1881, xiii, p. 154.

children, of whom three girls inherited the disease, while the fourth, a boy, escaped. Many other remarkable family-trees could be mentioned.

In the Molucca Islands and some other isolated regions, ichthyosis, on account of its unusual prevalence, has been regarded as an endemic affection; but instances of this kind are readily explained, without referring to climatic influences, by the operation of heredity and inter-marriage.

Pathology.—In the mild forms, Unna describes an immediate formation of the horny layer from the rete without the intervention of keratohyalin. The result is a complete cornification, the horny cells being homogeneous and containing no nuclear remnants. In this respect the process of keratinization is unusual, and contrary to the belief of many observers that cornification is impossible without the intervention of the keratohyalin of the granular layer. The rete is thinned more from an atrophic condition of the cells than from an actual diminution of their number, though this does occur sometimes, so that only one or two layers of cells cover the papillæ. The lymph-spaces are also very small. The extremities of both the rete-pegs and papillæ are broad and flattened and their necks narrowed, so that they suggest a dove-tailed appearance. The coil-glands possess a swollen epithelium and a widened lumen, resembling their excretory ducts, which exhibit less functional activity. The follicle-mouths either are dilated with a broad, horny plug, or are closed, retaining the plug in the dilated neck.

In a histological study of the skin of a case of ichthyosis congenita born at term, Wassmuth found the chief changes in the epidermis. As a whole, the epidermis was greatly hypertrophied, and a clear differentiation into the usual layers was not possible, owing to the early keratinization occurring throughout its entire extent. Occasionally cells containing keratohyalin granules were noted in places, but a well-defined stratum granulosum was present only in the scalp. The stratum corneum was greatly thickened in all regions, being most marked in the scalp, the palms and soles, and least marked in the chest and abdomen. The rete Malpighii shared in the hypertrophic process, and many rete-pegs were dove-tailed by the enlarged and numerous increased papillæ of the corium. The papillæ are described as being enormously increased and containing networks of distended capillaries. The sweat-glands were increased in number, but otherwise normal. The sebaceous glands were increased in number and at times deformed by keratinization of the follicle-mouths. The hairs grew normally except for their deformed shape, caused by the thick and dense horny layer. The corium showed only an insignificant chronic inflammation of low grade, with a decreased amount of elastic tissue and the changes in the papillæ above noted.

The histology of the lesions in ichthyosis follicularis as described by MacLeod showed the process to be primarily a hyperkeratosis involving not only the hair-follicles but the intervening skin as well. There were thinning of the underlying rete and a flattening of the interpapillary

process. The lower part of the hair-follicles was atrophied as the result of pressure by the hyperkeratotic plug in the funnel-shaped follicle above. The underlying corium showed some dilated vessels, with a moderate cellular infiltration. The latter, though suggesting a mildly inflammatory reaction, was considered secondary to the epithelial changes above noted.

Diagnosis.—Ichthyosis not only presents features which are so characteristic as to be unmistakable, but also those which can well-nigh perfectly be portrayed in plates. In this respect it differs from a long list of cutaneous maladies (*Cf.* portrait of the ichthyotic skin in Plate F of Duhring's *Atlas*).

Whenever necessary in the establishment of a diagnosis, aid of an important character can be obtained in the history of the disease and in recognition of the absence of the lesions and lesion sequels exhibited in the exudative and scaling affections heretofore considered. The most conspicuous characteristic of ichthyosis, as distinguished from psoriasis, lichen ruber, and pityriasis, is the absence of inflammatory phenomena.

Treatment.—Internal treatment, as a rule, is not of much value, though authors recommend sulphur, thyroid extract, antimony, and jaborandi; thyroid extract is particularly recommended by many.

External treatment is directed to softening, macerating, or anointing the skin, and, so far as practicable, to preserving it in a softer state. This softening is accomplished by frequent baths, alkaline, vaporous, or combined with the use of ordinary or green soap, and generally followed by an anointing with vaselin, dilute glycerin, or lard. The French, after the removal of the denser layers of the horny plates with the aid of soft-soap and water, anoint the body by friction with glycerite of starch. Almond-, cod-liver-, or linseed-oil, benzoated lard, lanolin, or, even better, salicylated cocoanut-oil, or olive-oil and glycerin in the proportion of 3 parts to 1, may be used after the bath. Stelwagon and others recommend the addition of resorcin to the unguents in the strength of 2 to 10 per cent. Sulphur and ichthyol salves have also been praised. Only by the most assiduous perseverance is a desirable result obtained and permanently secured. In the severe hystrix varieties the most annoying projections and rugosities may be removed by excision, by the Paquelin knife, or, less preferably, by the aid of caustics.

Subcutaneous injections of $\frac{1}{4}$ grain (0.016) of pilocarpin have been practised in ichthyosis, in order to induce sweating, thereby producing maceration of the skin. Van Harlingen recommends the following for use when the epidermis begins to shed after the application of soft-soap:

R—Potass. iodid.,	℥j;	1	33
Ol. pedis bubuli,			
Adipis,	āā	℥ss;	āā 15
Glycerini,		℥j;	4 M.

Anderson recommends the wearing of pure vulcanized India-rubber garments, a method of treatment too exhausting for many cases.

Taking a general survey of the therapeutic management of ichthyosis and its results, the course to be advised for the majority of patients is clear. With but few exceptions, the subjects of this disorder are either entirely relieved or greatly better during hot weather and in moist atmospheres. Marked exceptions to this rule, however, occur. Under these circumstances, and having regard to the essential fact that the deformity is lifelong in duration, patients should always, when practicable, select for permanent residence a climate most conducive to the comfort of the skin. There is no step which the ichthyotic patient can take comparable in value with the selection of a suitable environment.

Prognosis.—Bearing in mind the facts set forth above, it will be clear that in no case can a favorable result be anticipated with respect to a "cure" of the disease. Treatment, persistent, prolonged, and properly directed, in connection with suitable climatic influences, may do much to improve the condition of the skin.

Erythrodermie Congénitale Ichtyosiforme.¹—Under this title Brocq² grouped several cases having symptoms in common, which seemed to represent a new dermatosis. The chief characteristics are as follows:

The disorder begins in earliest infancy and is congenital. It is characterized by a generalized redness, which is exaggerated on the neck and about the folds of the joints and on the limbs. It is associated with a marked general hyperkeratosis and enlargement of the papillæ of the skin. There is seborrhea of the scalp, and in all the cases the hair and the nails grow more rapidly than normal. In certain cases the hair is thinned.

No etiological factor was determined, except possibly hereditary syphilis. No response was had to treatment for the latter disorder. The disease is to be distinguished from ichthyosis by the redness of the skin and by its different localization; from pityriasis rubra pilaris by its congenital origin, by the absence of follicular papules, and by the type of desquamation; from pityriasis rubra, in that it is congenital, has a different course, and is unattended by serious impairment of the general health.

KERATOLYSIS EXFOLIATIVA CONGENITA.

This is a rare disorder, only a few cases of which have been recorded. Sangster³ recorded a case in a man aged twenty-four years, in whom the process of desquamation began in the third week of life and became universal by the end of the third year, afterward persisting, with constant exfoliation in large sheets. There were areas of infiltrated

¹ BIBLIOGRAPHY: White, C. J., *Jour. Cut. Dis.*, 1910, xxviii, p. 533 (case demonstration). Pernet, *Brit. Jour. Derm.*, 1911, xxiii, p. 344. Jackson, *Jour. Cut. Dis.*, 1909, xxvii, p. 36 (case presentation).

² *Annales*, January, 1902, p. 1; *abstr. Brit. Jour. Derm.*, 1902, xiv, p. 402.

³ *Brit. Jour. Derm.*, 1895, vii, p. 37.

skin divided in quadrilaterals. The palms and soles were thickened and soddened from hyperidrosis, but there was no exfoliation in these regions. Itching was severe, and there was secondary infection from scratching. Where thickening was not great, the skin felt brittle and paper-like, as though the epidermis were dead and had lost its organic connection with the deeper layers. On picking up the partially detached margin of the epidermis, the latter could be peeled off in sheets three or four inches square without pain or inconvenience to the patient. The part thus exposed was grayish-white, smooth, and soft, and within a few hours became hyperemic. The nails and hair were unaffected.

Inasmuch as the process was essentially non-inflammatory, it resembled ichthyosis. It was considered to be due to faulty developmental changes in the upper portion of the epidermis.

Rasch¹ recorded a somewhat similar case, and after a histological study of the condition he termed it *Ichthyosis rubra*. A case resembling the above, but with milder symptoms, has been under the observation of the author. In this case desquamation had existed since birth. On superficial examination, little change in the skin was noted. More careful examination revealed rolls of epidermis covering the trunk and other portions of the body. On grasping these between the fingers, thin sheets of epidermis, several inches in length, could be removed. Some hours after the removal hyperemia supervened, which subsided in the course of three or four days. No subjective symptoms were present.

SCLERODERMA.

Synonyms.—Hide-bound Skin, Dermatosclerosis, Chorionitis, Scleriosis, Sclerema Adultorum. Ger., Hautsclerem; Fr., Sclérodermie.

Definition.—Scleroderma is a condition in which the skin is affected with a circumscribed or symmetrical, variously tinted induration, exhibited at times in spots, streaks, bands, patches, or diffuse areas, often associated with telangiectases and pigmentation of the part involved.

There are three fairly distinct variations of the process: the symmetrical, which may be more or less generalized; the circumscribed, and the digital. In rare instances they merge in the same patient.

Symptoms.—**Diffuse Symmetrical Scleroderma.**—The cutaneous symptoms of the disease may be slowly or rapidly evolved, and be preceded by prodromic pains of a rheumatic character, or by peculiar cutaneous sensations (prickling, tingling, formication), or by muscular cramps and neurotic sensations. In rare instances, also, there may be vesicles, blebs, scales, local hyperidrosis, or losses of sensibility in the skin which is about to become the seat of the disorder.

With and without these prodromic features, the skin and sub-

¹ Zeitschrift, 1901, viii, p. 669; abstr. Brit. Jour. Derm., 1902, xiv, p. 110.

cutaneous tissue, chiefly of the upper portion of the body, becomes symmetrically involved either in a gradually increasing induration, or in an obscurely defined edema of a firm character, which at first pits under strong pressure with the finger, but later becomes as indurated and tense as hard leather. The integument is usually exceedingly difficult to pick up between the finger and thumb, and is shining, smooth, waxy, or of alabaster-like hue; in other cases it is of a dirty-yellowish, grayish shade. The line of demarcation between the sound and the affected integument is indistinct, but as the disease

FIG. 111



Generalized scleroderma of long duration, with resulting ulcers.

affects the subcutaneous tissues as well as the skin there is often a peripheral extension of the indurated area underneath the healthy skin. In the edematous variety, the indentations left after firm pressure remain for some time, and the skin and subcutaneous tissue are practically immovable over the underlying structures. The onset of the disorder may be acute, rapidly involving the body-surface, or the sclerodermatous change may be insidious in its progress, affecting one region only and thence slowly spreading to others, or being arrested after any grade of advance has been attained. In the stage of infiltra-

tion, when the disease is pronounced, it can hardly be mistaken for any other condition. The face may be mask-like, immobile in features, and expressionless. The lips are then stiffened and open with difficulty; the eyelids are similarly but much less severely involved. The back of the neck may be firm; the chest, shoulders, and arms may be either immovable or movable with difficulty; the ribs are often bound down so firmly by the cuirass of leathery integument that respiration may be seriously impeded. The abdominal surface, also, is usually involved. Often the upper extremities are so affected that the fingers resemble curved talons; the wrists lose their flexibility, the forearms their usefulness. So extreme is the helplessness of some of these patients that they require to be dressed, washed and fed, even when able to travel with relative comfort. The temperature is not changed, and sweat may or may not be excreted from the affected area. The progress of the disorder to this stage covers usually a period of years, but in exceptional cases the result may be accomplished in a short time.

FIG. 112



Scleroderma occurring in patient with morphea guttata.

In the later or atrophic stage of the affection, the edematous or infiltrated areas undergo induration and contracture. According to Crocker, it is only the edematous cases which are followed subsequently by atrophy. An interesting case of this type, but of localized distribution, is recorded by Sutton and Kanoky.¹ In a patient under the observation of the author for many years, a generalized edematous scleroderma was present. In the early stages the arms and chest were affected. Deep pitting was always noted in this stage, and on account of the immovability of all the structures the usefulness of the arms was much interfered with. As absorption took place, the tissues became softer, and finally distinct areas, usually linear, of

¹ Jour. Cut. Dis., 1909, xxvii, p. 556: A Comparative Study of Acrodermatitis Chronica Atrophicans and Diffuse Scleroderma, with Associated Morphea Atrophica (with references).

marked atrophy were left. In these areas the skin became soft and all the subcutaneous induration was absorbed. With the exception of moderate loss of strength in the hands and slight immobility in the wrists, the patient fully recovered. In the cases in general, the skin becomes more and more tightly stretched and thinned over the underlying structures, and it is no longer possible, after drawing the finger over the surface, to produce a yellowish-white tracing of its route, that disappears as the circulation slowly returns along the line. When this condition is reached, the atrophic skin becomes dry, scaling, fissured, or even ulcerated; the wrinkles of the face disappear; the muscles waste considerably. The limbs may be reduced in circumference by several inches; the teeth may fall; the fingers be permanently flexed into the palm, or the forearm on the arm. When the condition reaches this grave extent, the patient, who before seemed to enjoy a fair degree of health, may suddenly experience rheumatoid pains and neuralgias, or exhibit other signs of constitutional impairment, and intercurrent visceral disorders may gradually bring on a marasmus, which in some of the reported cases has ended with renal, cardiac, or pulmonary symptoms.

Circumscribed Scleroderma (*Morphea*, *Keloid of Addison*).—Circumscribed scleroderma or morphea is characterized by the occurrence of one or of several discrete, well-defined, firm, and smooth points, patches, lines, or bands, that are often slightly elevated or depressed, and surrounded by a delicate violaceous or lilac-tinted halo, the involution of which may be followed by macular, punctate, or striate atrophy of the skin.

This form of scleroderma was once held to be rare. It is, however, more commonly under observation than is usually believed. French authors distinguish between the variety displayed in plaques and that occurring in bands. Some forms of the latter variety resemble closely *lineæ atrophicæ*.

Patches of morphea commonly begin as rosy or violaceous macules, which irregularly extend in area from finger-nail-size to larger patches, some slowly, others comparatively rapidly. In a variable period of time, the centre of each patch becomes whitish or yellowish, while the peripheral portions of the plaque retain their peculiar shade of color. There is thus formed a roundish, oval, or irregularly outlined area, occasionally several inches in diameter, with a central portion slightly deepened or somewhat elevated, infiltrated, and "lardaceous," or flattish, and near the level of the adjacent skin. The blanched centre has often the hue of old ivory; later this may be commingled irregularly with a flattened streak or band, distinguished with difficulty from scar-tissue. These patches may be single or multiple; in the latter event, they are arranged, as a rule, along the line of distribution of the cutaneous nerves of the trunk, along the inner faces of the thigh, more often on the lower than on the upper extremities, and asymmetrically in most cases. When the tissue is pinched between the thumb and finger, it at first gives the impression of stiffness and hardness;

in the later stages of the disease the skin may be so atrophied over the region involved that it is impossible to make this test. The surface is dry and smooth, or, when very carefully inspected, is seen to be traversed by exceedingly delicate lines. In some instances the plaque is dotted regularly with depressed points, resembling the patulous orifices of sebaceous glands of the face in certain cases of acne, the slightly discolored, minute, funnel-shaped orifices contrasting thus with the dead-white hue of the patch. In other cases this appearance of dotting or picking-out of the surface is more conspicuous at one part than another, being, for example, well shown at an advancing border, with a dead-white, depressed centre, or at both extremities of a long oval.

The border of typical patches is characteristic. It is made up usually of a narrow zone having a pinkish, lilac-tinted, or violaceous hue, which, when closely viewed, is seen to be constituted of a plexus of fine vessels. The zone may be wanting wholly, as is well shown in some cases in which the temple is involved; the border also may be present in such degree as to be fully as conspicuous as the whitish central area. In a patient presenting a dime-sized patch over the sacrum, together with a few multiple spots on the side of the neck (a portrait of the same having been made in oil, Hyde), the flame-like, violet-shaded areola extended for several inches on one side away from the disk, and one of the larger vessels of which it was constituted could be seen at a distance of several feet from the patient.

The band form of circumscribed scleroderma usually occurs in ribbon-shaped elongations stretching along a limb in its longitudinal axis, or over one-half of the face or forehead. Several examples involving the forehead and part of the scalp have been observed by the author. Most of these cases are distinguished by the occurrence of either an elevated ridge or furrow, or an elevated ridge with a furrow on one side. The median line of the forehead is the commoner site of this anomaly on the face; over the trunk it is best displayed on the chest. Sequeira¹ demonstrated a patient with a lesion one and one-half inches wide extending from near the anterior-superior spine of the ilium down the entire length of the leg. In this patient other linear areas, small atrophic white spots, and several large, dark, sclerosed areas were present, the patient showing both atrophic and sclerotic changes. Purplish and even blackish hues at times have been recognized in the halo by other observers.

As a rule, there are few subjective phenomena. In some instances itching, tingling, pricking, and other sensations are experienced. The variations observed in this affection are as numerous as they are striking. In some cases the patches closely resemble scars; in others there is marked pigmentation, diffuse or circumscribed; in yet others the capillaries traversing the patch constitute a complete network of predominant symptoms.

¹ Brit. Jour. Derm., 1908, xx, p. 198.

Between the types of scleroderma noted above are to be found instances which it is difficult to assign to one class or another. Some are mixed forms, in which diffuse scleroderma is developed in one part of the body and a circumscribed form in another; in other cases numerous morphea plaques are distributed symmetrically over the body or develop a generalized symmetrical scleroderma. As a rule, the symmetrical forms occur most extensively over the upper part of the body; while the more frequent unilateral plaques of morphea affect in greater proportion the lower limbs. In the last four patients seen by the author, single patches of morphea were situated on the breast in two, on the abdomen in one, and in the fourth on the forearm. Often the symptoms in the edematous form resemble those characteristic of edema neonatorum, with pitting of an edematous surface under pressure. Great variation has been noted as regards the presence, absence, or increase of sensibility. Sweat and sebum may or may not be secreted from the affected patches.

According to Besnier and Doyon, pigmentation is one of the most important of sclerodermatous symptoms. Besides the pigmented dots visible over the sclerosed patches, there often exists a species of chloasma in the form of bronzing, diffuse or in irregular islets, over the neck, shoulders and elsewhere. These pigmentations are often interspersed with whitish patches of vitiligo.

The course of the disease is usually chronic. Many patches, after reaching an average degree of extension, advance no further. In the edematous form, after atrophy has occurred, the process appears to come to an end; in yet other cases the progress continues through life, or the serious phases of diffuse scleroderma in advanced grade are exhibited. In still others, atrophy of the skin, subcutaneous tissue, and muscle may slowly or rapidly follow, and result in the production of attachments to periosteum or in deformity due to contracture. Ulceration may ensue, and in a few instances has occurred early in the disease. Atrophy of the bone is an exceptional result. In yet other cases absorption of the material constituting the areas is effected without sequels of any sort.

The course of circumscribed scleroderma is either chronic, lasting for from one to ten years or more; or subacute, with evolution accomplished in a comparatively short time.

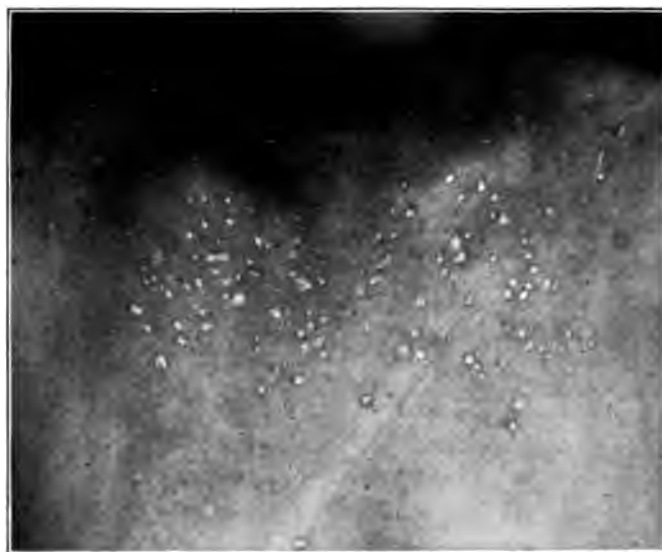
Morphea Guttata (White Spot Disease)¹.—In this variety the eruption occurs chiefly on the anterior surface of the chest and on the neck and shoulders; occasionally on the arms, forearms, and other parts of the body. The most striking feature of the eruption is the color, or rather absence of color, the plaque being chalk-white or snow-white. The lesions vary in size; for the most part, they are that of a pinhead to that of a small pea or larger, and show little tendency to coalesce.

¹ Montgomery and Ormsby, Jour. Cut. Dis., 1907, xxv, p. 1: White Spot Disease (Morphea Guttata) and Lichen Planus Sclerosus et Atrophicus (a clinical and histological study of three cases, with a review of the literature). MacKee and Wise, *ibid.*, 1914, xxxii, p. 629: White Spot Disease (a clinical and histological description, with discussion and bibliography to date).

Occasionally, irregular patches are formed by incomplete coalescence of individual lesions. The lesions may have a narrow line of brownish-red pigmentation, or a small reddened areola. When patches are formed, pigmentation may be marked at their margins. In time the lesions gradually undergo a distinct atrophy, the epidermis becoming thin, parchment-like, and slightly depressed. In these cases there are no subjective symptoms.

The connection between this variety and scleroderma is well shown in a patient exhibiting a band of typical scleroderma extending over the knee to the ankle (Fig. 112), and typical spots of morphea guttata over the chest and other regions (Fig. 113).

FIG. 113



Morphea guttata.

Sclerodactylia.—This special form of scleroderma affects the extremities, especially the feet. The disease is apt to begin in childhood and progress steadily but slowly through life. It affects the tips of toes and fingers at first, and gradually extends upward, involving finally the entire toes and fingers, feet and hands, ankles and wrists, legs and forearms; or it may affect only the lower or upper extremities symmetrically. The affected skin is tightly bound down to the subjacent structures, so that it cannot be drawn into folds, and it presents a reddish, shiny, glazed appearance. The stiffness of the skin interferes with the motion of joints to such a degree as to render the affected parts useless. Finally, ulcers form on the ends of the digits. In rare instances these have become the seat of epitheliomatous growths. Occasionally, sclerodactylia is preceded for some years by symptoms of

Raynaud's disease.¹ Subcutaneous calcareous concretions in association with sclerodactylia were noted by Scholfield and Weber.² Occasionally, distant areas of scleroderma are present.

Hemiatrophia Facialis.—Severe grades of the disease are noted by several authors, in which to a varying extent the surface of the lateral half of the face has been involved. Here not only the subcutaneous tissue, but also the aponeuroses, periosteum, and bones, may participate in the atrophy, a fact well illustrated in the case of Robinson's patient.³ In this instance there were also distinct sclerodermatous lesions on the face of one thigh.

Etiology.—About three-fourths of all cases occur in women. The young and middle-aged are generally the victims of this disorder, though cases are reported not only in the first year of life but in advanced years. The predisposing causes of the affection are: rheumatism and the climatic changes to which rheumatism is most often attributed (in the light of modern research this should be included under the heading of infections or intoxications); all neurotic states due to emotional influences, grief, or anxiety; traumatism by friction, blows, and direct injuries of nerves;⁴ blisters; exposures to the direct action of the sun; and obscure disturbances of the nervous centre that are difficult to appreciate. Sequeira⁵ concludes that morphea does not depend upon an affection of the peripheral nerves, but that it is probably due to a central (ganglionic) lesion, and that this acts by vasomotor or trophic influence.

Scleroderma has occurred as a complication of Graves' disease, and in association with Raynaud's disease, lepra, Addison's disease, and other morbid states. Cases suggesting a toxic origin have been recorded by Adamson,⁶ Little,⁷ Pernet,⁸ and many others.

The possibility that in some cases syphilis may be responsible for the vascular obliteration that obtains in scleroderma has been suggested by several observers. Therapeutic results, also, have been positive in establishing such an etiological factor. Williams⁹ reports improvement in a case of scleroderma with obstinate ulcers on the legs by treatment with mercurial inunctions. In a number of cases the Wassermann reaction has been positive.¹⁰

Pathology.—Most authors view scleroderma as a trophoneurosis or as an angio-trophoneurosis, depending upon unknown changes in the trophic centre. Osler¹¹ states: "The analogy of myxedema, to

¹ Wild, *Brit. Jour. Derm.*, 1912, xxiv, p. 157; Cocks, *Jour. Cut. Dis.*, 1910, xxviii, p. 149; Juan de Asua, *Actas Dermosifiliograficas*, 1912, iv, No. 2 (abstr. *Jour. Cut. Dis.*, 1912, xxx, p. 506).

² *Brit. Jour. Derm.*, 1911, xxiii, p. 276.

³ *Amer. Jour. Med. Sci.*, 1878, lxxvi, p. 437.

⁴ Bunch, *Brit. Jour. Derm.*, 1909, xxi, p. 24: Morphea (distribution following the right supraorbital nerve on forehead, following an injury on the site).

⁵ *Ibid.*, 1911, xxiii, p. 40 (two cases of fronto-nasal morphea).

⁶ *Ibid.*, 1908, xx, p. 230.

⁷ *Ibid.*, 1910, xxii, p. 57.

⁸ *Ibid.*, 1908, xx, p. 230.

⁹ *Ibid.*, 1910, xxii, p. 361.

¹⁰ Cf. Whitehouse's paper on this subject presented before the American Dermatological Association, June 3, 1909, *Jour. Cut. Dis.*, 1909, xxvii, p. 535; and Lustgarten, *ibid.*, p. 304.

¹¹ Osler's *Modern Medicine*, 1909, p. 666.

which scleroderma is the cutaneous antithesis, suggests that it may be caused by some alteration in an internal secretion, or some disturbance of that nice balance between the various internal secretions . . . which some believe play such an important role in nutrition. . . . The frequency with which acute forms follow an infection is paralleled by the thyroid insufficiency and atrophy caused by myxedema after a fever, such as measles and scarlet fever." In five cases Singer and Beer¹ found decrease in the size of the thyroid. Hektoen and Wells² found marked atrophic and cystic changes in the thyroid, and from a chemical examination demonstrated its reduced functional capabilities. Rasch,³ describing a case of scleroderma with changes in the mucosa of the mouth and Basedow-Addison symptoms, believes there was an insufficiency of all the internal secretions. In a histological study of diffuse scleroderma, Unna found the main process to be an hypertrophy of preëxisting collagenous bundles, affecting equally all parts of the cutis, which led to simple pressure atrophy of the vessels as well as the epidermic structures. Early the blood-vessels were dilated and surrounded by swollen and increased numbers of connective-tissue cells. Later they were narrowed, cord-like and distorted by compression of the collagenous bundles, with corresponding decrease in the number and size of the connective-tissue cells. The changes in the elastin are only those due to pressure from the increased collagenous tissue. The latter extends into the hypoderm and replaces the fatty tissue. The atrophy which occurs later is similar in appearance to that induced by other causes, and is sometimes brought about by an endarteritis. The epidermic structures and vessels suffer first, and the collagen later, the ultimate result being a parchment-like, thin, cutaneous plate, without suggestion of hypoderm or papillary body, and covered by an atrophic epidermis. The histology in a case of diffuse scleroderma is summarized by Hektoen as follows: "There is a great hyperplasia of the collagenous intercellular substance in the corium, with flattening of the papillary body, together with a breaking-up and spreading asunder of the elastic fibers, obliterative thickening of the blood-vessels, and atrophy of the interpapillary epithelium, as well as of the epidermis, the hair-follicles, and the coil-glands." In morphea Crocker found the epidermis only slightly altered. In the corium the superficial vessels showed thrombosis. There was a perivascular cellular infiltration, constituting irregularly branched masses of small round cells. Branching from the cell-masses there was often a reticulum of fine fibrils, along which cells were attached. About the sebaceous glands and hair-follicles the cell groups and reticulum were abundant. Slight deposits occurred, also, about the sweat-ducts, but not about the coils. In the later stages the essential feature was an increase in the collagenous tissue. This, by pressure, obliterated to a marked degree the blood-vessels, sebaceous

¹ Berlin klin. Wochenschr., 1895, p. 46.

² Jour. Amer. Med. Assoc., 1897, xxviii, p. 1240.

³ Zeitschrift, 1912, xix, No. 3, p. 244.

glands, and sweat-ducts. In certain areas the connective tissue was increased between the acini of the sweat-glands.

From these findings Crocker interprets the process to be a defect in innervation, producing cell-exudation around the blood-vessels, thus narrowing the lumen, obstructing the blood-flow, and leading to thrombosis and sometimes to rupture and effusion. Each atrophic spot seen near a growing patch is the base of a cone from which the blood-supply is cut off, and the violet zone is due to the collateral hyperemia around an anemic area.

Unna's card-like scleroderma is more superficial than the ordinary morphea above described, and in histology resembles to a certain degree the guttate form. In the latter variety the author found the following changes: The chief pathological changes were noted in the corium. The collagenous bundles were comparatively thick and hypertrophic, were straighter than normal, and showed but little interlacing. The bundles traversed the field in a horizontal direction, and only a comparatively few connective-tissue nuclei were present upon them. There were numerous dilated lymph-spaces, many of which contained some round and connective-tissue cells; only an occasional mast-cell was noted. Pigment-cells were present throughout the corium and extended fairly deeply into the pars reticularis. Pigment-granules were also detected apart from the cells. The elastin was normal, but its arrangement was modified by the changes in the collagenous bundles. The papillary layer was not well defined, as large bundles of collagen extended into it in places. The wavy line between the epidermis and corium was poorly defined, but not obliterated. The vessels were few and represented chiefly by narrow longitudinal bands of cells. Their lumen was usually not demonstrable, and they were apparently obliterated by the intravascular proliferation. The glands of the skin were represented by a few deeply situated coil-glands and partially obliterated sebaceous glands. All these structures were surrounded by a small round-cell infiltration, which was also present in independent small areas. In the epidermis there was marked hyperpigmentation, the pigment-granules showing throughout the basal and adjoining layers, extending in places to the third and fourth layer of cells. The hypertrophy of the collagen, comparative absence of blood-vessels, large numbers of dilated lymph-spaces, hyperpigmentation both in the rete and corium, and comparative absence of the glands of the skin are all recognized features of ordinary scleroderma.

Diagnosis.—In vitiligo there is an entire absence of all structural cutaneous changes, and the skin has a characteristic milky-white color, the hairs of the part being also blanched. The pigmented macules and atrophic patches of lepra present anesthetic or hyperesthetic symptoms, and their coincidence with, or sequence from, other readily recognized symptoms of the disease, such as tubercles, bullæ, ulcers, and involvement of other organs and tissues, differentiates the latter from scleroderma.

In sclerema and edema neonatorum the age of the patient will serve to distinguish the disorders from scleroderma.

In *cancer en cuirasse* (papillary cutaneous carcinoma), chiefly of the skin of the breast in women, but encountered elsewhere, the resemblance to scleroderma is striking, and eminent surgeons have confounded the two. In both affections the skin, especially that of the thorax, is converted into a dense, leathery cuirass, but the distinction is made as follows: First, the carcinomatous condition of the skin may be secondary to a cancerous change in the breast or nipple, in which case the doubt is readily removed; second, if primary, the firm, isolated, and deeply tinted nodules of cancer are readily distinguished projecting from the dense peripheral cutaneous infiltration; third, the edema and lymphangitis associated with cancerous involvement are most often unilateral, and are limited very distinctly to the arm on the side of the body most seriously involved; fourth, the line of demarcation of the cancerous change, while indeterminate on one side, is usually at the edge of advance distinguishable by tongue-like erythematous prolongations of a dull-reddish hue; lastly, the tendency to ulceration, the coincident and resulting cachexia, the possible axillary adenopathy, and the relatively rapid and fatal result in cases at all liable to be confused with scleroderma, point severally to the truth.

In ichthyosis, the congenital history, the presence of ichthyotic plates over the affected surface, and the general conservation of the health of the patient suffice to identify the disease.

In xeroderma pigmentosum, the hyperpigmentations, warty growths, telangiectatic areas, with subsequent ulcers and tumor-formations, and limitation of the disease to the exposed parts, suffice to distinguish its character.

The resemblance between scleroderma and acrodermatitis chronica atrophicans is close, and in certain cases a differentiation is impossible (Cf. chapter on latter disorder).

Treatment.—In the management of symmetrical or generalized scleroderma, the influence of climate should be considered. More improvement is secured for these patients after removal to a dry, equable climate than can be obtained elsewhere. If they must remain under unfavorable climatic influences, the body should be well protected by woollen, over muslin, silk, lisle-thread, or balbriggan undergarments; and, while an outdoor life is desirable, such exposure should always be avoided in unfavorable weather. Internally, cod-liver oil, the ferruginous tonics, and a nutritious diet are often indicated. Roques,¹ in a published record of the effects of thyroid administration, reports that success by the use of thyroid extract was noted in 63.7 per cent. The treatment should be started early and given in small dosage over long periods. Suprarenal extract is of some value in certain cases; pituitary extract was of no value in four cases; testicular and ovarian extracts also have been used without success. Kolle² reports much improvement in scleroderma treated with coeliacin (an extract of the

¹ Annales, July, 1910, p. 383; abstr. Brit. Jour. Derm., 1911, xxiii, p. 92: Opothera-
peutic Treatment of Sclerodermia (full bibliography on this phase of the subject).

² Münch. med. Wochenschr., January 7, 1913, ix, p. 24; abstr. Jour. Cut. Dis. 1913,
xxxi, p. 1057.

mesenteric gland), in dosage of 5 grains, three times daily. Schwerdt¹ reports favorable results in scleroderma by the internal administration of the mesenteric gland of the sheep in the form of tabloids, in dosage of 5 grains once or twice daily. Philippon² reports relief of severe diffuse scleroderma by the internal administration of salol in doses of from 2 to 3 grammes daily. Hebra³ reports good results in three cases from intramuscular injections, every second day, of 10 mms. of a 15 per cent. alcoholic solution of thiosinamin. The employment of potassium iodid, arsenic, mercury, and other remedies, such as lithium benzoate, sodium bicarbonate and salicylate, and the alkalies, supposed to be indicated by the rheumatoid symptoms, has been alike praised and condemned by men of eminence on both sides of the Atlantic.

The local treatment is by baths, massage, galvanism, alternate hot and cold douches, or the actual cautery over the spinal column. Following the daily salt-and-water or alkaline bath of a temperature suited to the season of the year and the physical condition of the patient, inunctions with cod-liver oil, lanolin, lard, vaselin, or neat's-foot oil, slightly scented, may be used. To these may be added with advantage in many cases 2 to 10 per cent. of the oleate of mercury or of ammoniated mercury or salicylic acid. In morphea Brocq employs electrolytic puncture as in the treatment of hypertrichosis. Mercurial plasters are employed in the intervals of each sitting. Radiotherapy, if used at all, should be employed with caution.

Prognosis.—Symmetrical diffuse scleroderma, well treated in young subjects, usually results favorably without impairment of the general health. When atrophic changes occur, the skin may recover its suppleness and pliability, but this cannot be assured. Deformity in either event may complicate an otherwise favorable issue. In a portion of the cases the disease becomes so extensive and severe as to produce a fatal marasmus; more frequently, death results from intercurrent disorders.

When the disease occurs in circumscribed patches (morphea), the majority recover without serious consequences; the few go on to sclerosis of subcutaneous structures and consequent deformity. In most of the simpler cases the disease from first to last seems to have but a local significance.

SCLEREMA NEONATORUM.⁴

Synonyms.—Scleroderma Neonatorum, Sclerema of the Newborn. Fr., Sclérème des Nouveau-nés; Athrepsie. Ger., Fettsklerem.

Definition.—This disease is not to be confused with edema neonatorum, from which it is distinct. It was described first by Underwood⁵

¹ Ibid., 1907, No. 25; abstr. Brit. Jour. Derm., 1908, xx, p. 101.

² Deutsch. med. Woch., 1897, p. 33.

³ Archiv, 1899, xlviii, p. 120.

⁴ For full discussion of the subject and bibliography, see monograph by Luithlen: Die Zellgewebsverhärtungen der Neugeborenen, Vienna, 1902; also Mraček's Handbuch, Bd. iii, p. 193.

⁵ Diseases of Children, 1784, p. 76.

in 1784, and is an affection of extreme rarity. It is a peculiar form of coagulation of the subcutaneous fat-tissue, accompanied by dryness of the skin, so that very little fluid exudes when it is incised.

Symptoms.—At birth, or between the second and the tenth day after, the lower limbs of the child assume a livid or whitish-yellow appearance, occasionally suggesting the hue of wax; and they become of a leathery consistency. This condition spreads gradually over the lumbar region, the dorsum of the body, and the chest in front and behind, and in the course of a few days may involve the entire integument excepting the palms, soles, and scrotum. When pressed upon with the finger, the skin produces the impression of half-frozen tissue; the face suggests a cold and rigid mask; the thighs in their sockets and the arms in the shoulder-joints are immobile. Usually there is somewhat less firmness of the abdominal integument. The taking of the nipple, deglutition, and even the opening of the mouth are effected only with great difficulty, and eventually become impossible. The respirations are difficult and slow (16 or less); the pulse may be 60, and in well-marked cases is imperceptible at the wrist; and the temperature is lowered (30° to 26°) though exceptions are noted. Lotta Myers¹ recorded an example in which at no time was the temperature found to be subnormal. There is often no cry.

There may be a coincident icterus; and often thrush has been observed in the mouth before the declaration of well-marked symptoms. The congenital subjects are often stillborn. The majority of victims of the disease perish before the ninth day. Diarrhea is usually present.

Etiology and Pathology.—The disease occurs in prematurely-born and feeble infants. Poor hygiene, insufficient and improper food and clothing are also factors and, according to Ballantyne,² most cases occur in the winter months and among foundlings. The loss of body fluids through diarrhea and internal hemorrhage are also important factors. One hypothesis concerning the origin of the disease is that it depends upon a changed condition of the fat. According to Langer and Knopfmacher (quoted by Luithlen), the fatty acid content in the infant skin is low, while the melting point is high. From this it follows that with a marked lowering of the body temperature in the disease, solidification of the fatty tissues occurs. The absence of fat in the scrotum and a higher fatty acid content in the palms and soles accounts for their immunity. That the loss of fluidity does not necessarily depend on a subnormal temperature is proven in rare instances by the occurrence of the condition with normal or increased temperature. *Histologically*, the chief changes are noted in the corium and hypoderm, where the connective tissue is contracted and the adipose tissue contains an abundance of fatty acid crystals. Parrot considers the process to be a drying up of the skin, with consolidation of its layers, together with atrophy of the adipose tissue.

Treatment.—The treatment of both edema and sclerema neonatorum is by elevating the body-temperature (in an incubator, wrapping

¹ Jour. Cut. Dis., 1909, xxvii, p. 87.

² Brit. Med. Jour., 1890, i, p. 403.

the entire body in wool, and by warm water-baths), and by improving the nutrition in every possible way (sterilized milk and stimulants by the stomach-tube, through the nose or pharynx). The body may also be well rubbed with warmed oil or camphorated alcohol. Brocq suggests friction with the warm hand in the direction of the return circulation.

Prognosis.—The prognosis is grave; in rare instances, when the sclerema has been partial, recovery has ensued.

EDEMA NEONATORUM.¹

Synonym.—Sclerodema (Soltmann).

Definition.—Edema of the newborn is the same as that of adult life. It presents special clinical features because of the undeveloped character of the infant's skin.²

It is characterized by the occurrence of an indurated tumefaction of the skin, most noticeable in the lower extremities of infants affected with impaired circulation.

Edema and sclerema of the newborn have long been confused. The distinction between them was first well established in 1877, when Parrot, under the title *Athrepsie*, first described with clearness the morbid condition now recognized as edema neonatorum.

Symptoms.—The disease, which is of exceedingly rare occurrence in America, is observed in infants prematurely brought into the world or at term, and of feeble vitality. Between the first and the third day after birth the child is found to be drowsy and difficult to waken, with the posterior and other parts of the thighs and legs, the hands, and the genital organs pallid, cold, livid, and retaining the impress of the finger as do edematous tissues in general. At this point recovery may ensue, but in severe cases the edema spreads, always more markedly in the lower portions of the body, and the skin becomes violaceous red, deep yellowish, or dirty looking. As the disease advances, the integument becomes more and more difficult of indentation. Meanwhile, the infant becomes more drowsy, its respirations fewer, its cry weaker, and its temperature lower. Death may ensue from a pulmonary complication, from diarrhea, or from any intercurrent disorder. Usually, the child passes into a state of coma. When recovery ensues, the edema becomes less marked and the indurated skin more and more impressible. A few days, in satisfactorily managed cases, suffice to restore the patient to a condition of health. In some instances, the edema begins in other portions of the body than those named; and occasionally there is a marked febrile reaction.

Etiology.—The recognized causes of the malady are prematurity of delivery, cardiac feebleness, syphilis, exposure to severe cold soon after birth, poor hygiene, atelectasis of the lungs, and malnutrition

¹ Full bibliography for edema neonatorum and sclerema neonatorum is given by Soltmann in Eulenburg's Real-Encyclopädie, 1899.

² Luithlen, Mraček's Handbuch, Bd. iii, p. 201.

from inability to take the nipple. Blacker¹ describes a case, seemingly typical, in which there was no evident etiology. The child at five weeks was perfectly well and properly nourished, but still retained the hard edema of the buttocks, thighs, part of the arms, and chest. The mother was always well, and the pregnancy, labor and puerperium presented no unusual features.

Pathology.—There is ordinary edema present. The skin presents the microscopical characteristics of a six to eight months old fetus.

Diagnosis.—The distinction between edema and sclerema neonatorum is not made without difficulty, the disorders greatly resembling each other. In sclerema the joints, and particularly the jaws, are immobile; the disease is likely to be generalized; the induration of the integument is greater; and there is no tendency to an edema chiefly marked in dependent parts of the body, as over the lower limbs.

The color of the skin in the two disorders may be nearly the same. The pitting on pressure of the swollen skin is highly characteristic of edema neonatorum.

Treatment.—The treatment is that of sclerema neonatorum.

Prognosis.—About 90 per cent. of the affected perish; but with proper treatment recovery may occur when edema is not generalized.

FIG. 114



Chronic hereditary trophedema.

HEREDITARY EDEMA OF THE LEGS (MILROY'S DISEASE).²

Synonyms. — Chronic Hereditary Trophedema, Dystrophie Edemateuse Héritaire (Meige).

Definition.—The condition, as the title suggests, occurs as a solid, white, indolent, and persistent edema of the lower limbs, occurring, as a rule, in different members of a family for several generations. Milroy reported a series of 22 cases among 97 people in six generations. Hope and French record an instance of 13 members affected out of 42 people in five generations.

Symptoms.—The lower limbs alone are involved, and the edema may appear shortly after birth, or the onset may be delayed until puberty or later. After becoming established, the edema remains permanently. It may involve only the ankles or the limbs to the knees

¹ Brit. Jour. Derm., 1898, x, p. 87.

² Meige, Nouvelle Iconographie de la Salpêtrière, No. 6, 1899, p. 453; abstr. Brit. Jour. Derm., 1900, xii, p. 372. Milroy, New York Med. Jour., 1892, lvi. Hope and French, Quarterly Jour. of Med., 1908, i, p. 312.

(which is most frequent), or in certain cases the swelling involves the thighs as well. There is absence of pain and no evidence of local obstruction (thrombosis, embolism). In certain cases there may be acute attacks, accompanied by systemic symptoms. The cause of the disorder, aside from heredity, is unknown.

Diagnosis.—The disease is readily recognized when occurring in a family with other members affected. It is to be differentiated from other conditions producing edema, such as scleroderma, and various circulatory diseases and infectious processes.

Treatment.—Hope and French found constant bandaging of value.

ELEPHANTIASIS.¹

Synonyms.—Elephantiasis Arabum, Pachydermia, Bucnemia Tropica, Elephant Leg, Barbadoes Leg, Cochin Leg, Spargosis Fibro-Areolaris, Hypersarcosis, Sarcoma Mucosum. Fr., *Éléphantiasis*.

Definition.—Elephantiasis is a chronic hypertrophic condition of the skin and subcutaneous tissue, induced by lymphatic obstruction, and not infrequently characterized by marked deformity.

Symptoms.—The disease is endemic in the tropics and due to infection with filaria. Sporadic cases occur in all countries. As the lymphatic vessels may be obstructed by pathological changes where filaria are not present, and as the resulting symptoms may be similar, if not identical, it is obvious that the clinical features presented in these different cases (filarial fever, abscesses, hypertrophy of glands, of limbs, of genitalia, of mammae, and of other circumscribed portions of the skin) may be the same. In the pages which follow, these symptoms, for convenience, are described in a single group.²

A more or less circumscribed hypertrophy of the skin and underlying structures may affect any portion of the body, but especially the lower extremities, the external genital organs of both sexes, the inguinal regions, and, more rarely, the upper extremities, mammary region, the buttocks, parts of the head (ears), and with rarity the tongue.

The disease is more common in the tropics,³ where it is usually of parasitic origin; but sporadic cases are of occurrence in all countries, and are not very rarely seen in portions of the United States.

The most frequent seat of elephantiasis is the lower extremity of one side, where the foot, the leg, or the thigh of the same limb may enlarge. The penis and scrotum of men, the labia and clitoris

¹ For bibliography, Cf. Hyde, *Morrow's System (Dermatology)*, vol. iii, p. 451; Manson, *Tropical Diseases*, 4th ed., p. 594; Scheube, *Diseases of Warm Countries*, 1903, p. 399 (bibliography).

² Cases of non-filarial elephantiasis occurring in temperate latitudes have been reported by Bernstein and Price (following peritonitis), *Brit. Med. Jour.*, March 16, 1907, p. 617; MacGregor, *ibid.*, 1898, p. 1597; Fowler, *Brooklyn Med. Jour.*, February, 1897; Lake, *Chicago Med. Record*, December, 1905; Southam, *Brit. Med. Jour.*, May 3, 1902 (gigantic enlargement of right lower extremity, with illustration); Rogers, *Med. Record*, July 28, 1900.

³ Manson, *Brit. Med. Jour.*, June 2, 1894, p. 1186, with illustration.

of women, the upper extremities, the face, the ear, and portions of the trunk likewise may become involved.

The disease is at times insidious in its approach, and generally chronic in its career, but may be ushered in with severe rigors, prostration, delirium, and fever. Usually, localized inflammations precede, as a cellulitis, an erysipelas, or a dermatitis, with or without involvement of the lymphatic vessels or glands. At the same time there is a condition of general fever (elephantoid or filarial fever), to which succeeds a defervescence, with abatement of the local inflammation, its sequels becoming manifested in a more or less persistent edema of the part lately inflamed. After intervals of days, weeks, or months, the pyrexia recurs with still greater involvement of the swollen tissues,

FIG. 115



Elephantiasis scroti.

FIG. 116



Elephantiasis of the foot and leg.

which, with each access of fever, increase in volume and gain in density. When the elephantiasic condition is fully developed, the skin is tense, glossy, and blanched; or wart-covered, ichthyotic, and pigmented in various shades; its follicles patulous, its glandular structures either hypertrophied or atrophied, the hairs thinned and roughened, and the nails correspondingly changed (onychauxis), with loss of lustre. Pressure upon the edematous part is followed by slight pitting, but the tissue beneath is felt to be brawny and indurated. The parts beneath the skin are increased perceptibly in volume, especially the subcutaneous tissue; and the circumference of a limb thus diseased may be many times larger than that of its fellow. Lymphangitis is usually declared by painful, cord-like, linear indurations of the part, associated

PLATE XVI



Elephantiasis Telangiectodes of the Upper Lip and Portions
of the Face.

with adenopathy of the nearest ganglia. In older cases the skin loses its glabrous aspect, and exhibits eczematous, verrucous, papillomatous, seborrhoic, and even ichthyotic changes. Pigmentation even to a blackish tint may ensue; scaling, fissuring, and furrowing are common; and the accumulation of altered sweat and sebum in these depressions is the source of an offensive odor. During the course of the disease almost all the elementary lesions of the skin may be displayed: macules, vesicles, papules, tubercles, pustules, blebs, ulcers, crusts, scales, excoriations, and fissures. Warty growths form, as large as those seen in ichthyosis hystrix, and in some cases reddish-colored tumors spring from the hypertrophied integument.

When fully developed in the lower extremity, the unwieldy limb, increased threefold and more in bulk, with the foot, ankle, and leg massed into one huge, cumbrous cylinder, bears a striking resemblance to that of the elephant, from which circumstance the malady first received its name among the Arabs. Locomotion then is impeded greatly or is rendered impossible. Not less striking is the similar deformity of the genital labia of women or the scrotum of the male, the latter at times hanging below the knees and even as far as the ankle (Fig. 115). The penis disappears in rugous folds, and the urine passes along a gutter formed of skin transformed into *quasi* mucous membrane. As a consequence of the fissures and excoriations which form, the lymphatic channels may be opened finally, and a true lymphorrhea result.

In elephantiasis of the scrotum there are frequently symptoms of irritation, both systemic and in the vicinity of the affected part (nausea, vomiting, inguinal pain, and adenopathy, epididymitis, effusion into the sac of the tunica vaginalis, inflammatory swelling of the spermatic cord, and at times hernia).

Subjectively, the disease may be regarded as productive of less discomfort than would be suggested by its formidable features. Pain is experienced occasionally, and during the exacerbations accompanied by pyrexia there is corresponding malaise. The chief subjective sensations are those induced by weight and consequent tension from the enormous masses of hypertrophied tissue.

A vascular form of the disease (*elephantiasis telangiectodes*, *telangiectatic lymphangitis*, *nevroid elephantiasis*) is occasionally seen. This variety, according to Virchow, is congenital in origin but with later development, the enlargement being due to over-nutrition from increased vascularity, particularly in the deeper tissues. The surface of the skin is not changed, but a lobulation may be detected by palpation (Crocker).

Lymph-scrotum (*Varix lymphaticus*, *Nevroid elephantiasis*).—Lymph-scrotum may be the precursory stage of elephantiasis of the same part. Commonly, an attack is announced by the occurrence of fever, soon followed by erythematous redness of the scrotal envelope, followed by the development of vesicles. The bursting of these is the source of the continuous drain which ensues. The scrotum becomes more or

less enlarged, and, though soft to the touch, is the seat of multiple, often numerous, lymphatic varices, which on puncture or spontaneous rupture give exit to a rapidly coagulating lymph or chyle. Several ounces of a clear or lactescent fluid may escape in an hour, and the discharge persist to the point of producing grave physical exhaustion. Inguinal and femoral adenopathy may be present.

Etiology.—In the endemic filarial type, the disorder is due to the *Filaria sanguinis hominis*, which is introduced into the body by the bite of the mosquito (the females of some family of the genus *Culex fatigans*). In the other cases different causes are to be recognized: predisposition of races or individuals, heredity, climatic influence, malaria, fatiguing labor with the feet and legs immersed in water, and filth have all been cited as favoring conditions. The disease is produced by lymphatic obstruction from many causes, such as by pressure of neoplasms and cicatrices; in pregnancy; following ulcers; and traumatism by pressure and friction; cutaneous disease (erysipelas, eczema), systemic affections (syphilis,¹ tuberculosis); diseases of the bone; and extensive operative removal of lymphatic glands.² Bacterial infection is believed by most observers to be the direct cause of the major portion of cases. Even in the filarial type, other organisms play an important part. Shattuck³ states that sporadic lymphatic elephantiasis and endemic elephantiasis are not essentially different. The *Streptococcus pyogenes* is the organism usually found.⁴

Moncorvo⁵ has described congenital elephantiasis, after study of ten cases, in none of which were filaria recognized. All the infants had feeble resistance; and the parents of some were affected with either erysipelas, syphilis, or lymphatic obstruction.

Pathology.—Even macroscopically, the elephantiasic mass is seen to be built up of hypertrophic elements representing all the tissues of which the part is composed. The knife with difficulty divides the homogeneous, whitish, and lardaceous mass, from which on pressure exudes a fluid of similar color. The subcutaneous connective tissue is found relatively much more enlarged and sclerosed than the epidermis and derma; though when section is made through the rugous and warty skin described above, all the elements of the papillary layer, rete, and stratum corneum are seen to participate in the hypertrophic changes. Here and there are loculi filled with fluid lymph. The sheaths of the blood-vessels, lymphatics, nerves, and the bones, muscles, and aponeuroses are also thickened, solidified, and occasionally agglutinated, so as to be almost indistinguishable in the mass of uniformly sclerosed

¹ Cf. Adamson, Brit. Jour. Derm., 1910, xxii, p. 161: Elephantiasis associated with tertiary syphilis. McDonagh, *ibid.*, 1912, xxiv, p. 24: Syphilitic elephantiasis of the scrotum (lymphangitis).

² Cf. Heidingsfeld, Amer. Jour. of Urology, May, 1912, viii, p. 263.

³ Boston Med. and Surg. Jour., cxliii, No. 19, p. 718.

⁴ Unna, Histopathology, p. 493; Sabouraud; Whitfield, Allbutt and Rolleston's System, 1911, p. 10; and many others.

⁵ Sur la Pathog. de l'Éléphant. congenit., Paris, 1895.

tissue. The pigmentation of the derma is marked, the nuclei of the connective-tissue cells are multiplied, and the cutaneous glands intact, hypertrophied in their epithelial linings and investments, or, at a later stage, atrophied.

It is evident that in many cases, as Virchow has pointed out, the earliest of the changes to be noted occur in the lymphatic system, the whitish and yellowish lymphatic fluid which then accumulates in the tissue resulting from obstruction of the lymph-channels. In some of the remarkable cases on record the lymphatic obstruction is the prominent feature of the disease, and the elephantiasic enlargement is subordinate in gravity to the former condition. Such are, for example, the noteworthy instances in which the lymph distends multiple cutaneous vesicles, after rupture of one or more of which the fluid streams away to a dangerous extent.

Diagnosis.—The striking deformity which characterizes elephantiasis will always suffice for its recognition. In the earliest stages of the disease, when there is merely edema or an erysipelatous or eczematous condition of the skin, it would be difficult, if not impossible, to decide as to the future of the disorder, especially in a locality in which only sporadic cases occur. A symmetrical hypertrophy of both legs and both feet, developing in America, even though described as elephantiasis, should carefully be studied before a diagnosis is made of the particular disease here considered. The same might be said of elephantiasis of but one lower extremity. A patient with an extensive deforming induration and enlargement of the right leg and foot, accompanied by pigmentation and a well-marked warty condition of the skin, who had been pronounced the victim of idiopathic elephantiasis Arabum, had received a fracture of the upper third of both bones of the same leg during the previous year, and had since the accident constantly worn a tight bandage encircling the limb at the seat of the injury. The deformity rapidly disappeared under the application of a roller bandage extending from the toes upward (Hyde).

A peculiar and rare, though characteristic, deformity of the labia majora of women—most commonly the labium majus of one side—results from a syphilitic gummatous infiltration, which must be distinguished from elephantiasis. In cases of this kind the history of the patient and the relative inferiority as to bulk of the affected organ point to the nature of the disease. The syphilitic labium rarely exceeds the size of a large fist.

A gigantic hypertrophied mass of elephantiasis type is occasionally to be discovered in the lower extremity of only one side in patients who have been for many years the victims of an unrecognized and long-untreated syphilis. Even when the leg is many times its normal size and weight, and its contour lost in a thickened and roughened epidermis resembling the bark of a tree, the diagnosis may be made by discovering here and there in the depth of the mass circular and characteristic scars of healed gummatous ulcers.

Treatment.—Prophylaxis of filariasis is secured by elimination of the mosquito. In the early stage of elephantiasis the febrile condition of the patient and the localized cutaneous inflammation are to be treated by the measures appropriate for the relief of these conditions. Quinin, especially in malarial districts, is of the highest importance. When the elephantiasic development is established, if the genitals are involved, the knife of the surgeon offers the best prospects. The result of such interference, both in the genitalia and the extremities, has in many cases been brilliant, though the mortality of such severe operations is necessarily great. When the lower extremity is involved, it should be maintained in a horizontal position, its ulcers if possible be healed, its excrescences removed, its circumscribed inflammations resolved, and then elastic compression be carefully and skillfully maintained by means of a rubber bandage. The toes are first separately enveloped, then the foot and ankle, and lastly the leg. The results are sometimes highly satisfactory. Similarly, the elephantiasic scrotum or labium majus requires support and constriction prior to operative interference.

Ligation and digital compression of the main artery supplying the elephantiasic leg have occasionally been followed by transient improvement. Instrumental compression has at times resulted in severe ulceration and a reawakening of the erysipelatous affection. Multiple punctures and incisions, made with a view to giving exit to the fluids contained in the mass, have been attended by no greater success. The main obstacle in all these surgical procedures is the lymphangitis which so frequently complicates the situation. None of them promises so well as nerve-stretching, which in a few isolated cases has been followed by noteworthy results. Excision of a portion of the sciatic nerve has also been followed by satisfactory changes. The use of the galvanic current has, when long continued, accomplished resolution of engorged masses of tissue. Elastic compression in the horizontal position for all cases not warranting nerve-stretching may be regarded as the wisest course when the extremity is involved. For the local treatment of the pachydermia proper, green soap, mercurial ointment, and bathing with hot or cold lotions may be advantageously employed. For patients whose disease is acquired in countries where the disorder is prevalent, a change of climate is of the highest importance; and having in view the social surroundings and habits of most victims of the disease, it is scarcely necessary to call attention to the need of a proper hygiene, diet, and tonic regimen. Fibrolysin has been used by Castellani¹ with improvement.

Prognosis.—The future of a patient may be regarded as most favorable when the disease exhibits an early tendency to respond favorably to appropriate treatment, and when circumstances permit of a resort to the best therapeutic measures which can be adopted, such as change of residence, persistent and careful dressing of the

¹ Jour. Cut. Dis., 1908, xxvi, p. 225.

affected part, and the removal of any exciting cause of the disease, such as a neoplasm, or an indurated cicatrix. In the severer cases a fatal result may occur early in the disease; but usually life is prolonged, burdened by the inconvenience of the enormous elephantiasic mass, in comparison with which the rest of the body often seems to serve as a mere appendage.

ACROMEGALY.¹

Acromegaly is a disorder involving several organs of the body and incidentally the skin, due to pathological changes (neoplasms) in the pituitary body.

Symptoms.—Transitory swellings due to vasomotor changes affecting the face and hands often precede for some time the classical manifestations of the disorder, which include cephalalgia, rachialgia, and paresthetic symptoms suggesting hysteria. These are followed by characteristic thickenings of the bones of the hands and the feet, spreading at times to the foot and the leg, and involving also the face, especially the under jaw. In well-marked cases the under incisors project beyond the line of the other teeth; the maxillary, malar, and occipital bones are thickened; the nose becomes long and broad; and the under lip, ears, tongue, and larynx are deformed by thickening. The fingers are large, blunt-pointed ("drum-stick deformity"), and tipped with nails that appear smaller than normal in comparison with the bulbous digits. The so-called "hexagonal face" is thus produced. In connection with these symptoms there may be interference with articulation, due to thickening of the tongue, a rough sound to the voice (from laryngeal changes), motor disturbances, and exophthalmos.

The skin and mucous membranes are often the seat of changes. In the skin there may be pigmentation, sclerosis, hyperidrosis (often coincident with polyuria), hypertrichosis, and the formation of keloid at points of trivial traumatism. The nails are thickened, flattened, and grooved. The subcutaneous fat often is increased. At times there is an almost characteristic engorgement of the skin of the cheeks, which, taken together with the altered contour of the face described above, furnishes a classical picture.

MYXEDEMA.

Synonyms.—Cretinoid Edema, Cachexia Strumipriva, Cachexia Thyroidea. Fr., Cachexie pachydermique.

¹ For bibliography, see Marie, *Rev. de Méd.*, 1886, vi, p. 297; Marie and Marinesco, *Trans. Derm. Cong.*, Berlin, 1890; Souza-Leite, *De l'Acromégalie*, Paris, 1890 (abst. of 49 cases); Collins, *Jour. Nervous and Mental Dis.*, 1893, xx, p. 48 (bibliography); Arnold, *Virchow's Archiv*, 1894, cxxxv, p. 1 (with list of cases published since 1890); Shallcross, *Phila. Med. Jour.*, 1901, vii, p. 771; and Kuh, *Jour. Amer. Med. Assoc.*, 1902, xxxviii, p. 295 (full bibliography).

This disorder was first described by Sir William Gull,¹ in 1873, and it has since been studied, both abroad and in this country, by many observers.

A complete description of the disease and a *résumé* of the literature are found in the report of the Clinical Society of London for 1888, and in Murray's elaborate contribution to the same subject, in the *Twentieth Century Practice of Medicine*, vol. iv, 1895. The report embodies the results of the researches of a committee—including Ord, Horsley, and others—specially appointed by the Society to investigate the subject.

Symptoms.—The disease occurs in both acute and chronic manifestations, usually after the fortieth year, and in women more often than in men. It may, however, first be noticed in childhood.

At the outset there is observed a gradually occurring, persistent and remediless anemia, succeeded in turn by hebetude, sluggishness of body-movements, and a characteristic change in the integument. The skin becomes dry, rough, yellowish, waxy, translucent, and firm, and does not pit on moderate pressure. The surface involved is commonly the seat of a fine furfuraceous desquamation, the mucous membranes often participating in the morbid process. In the cheeks there is usually perceptible a brawny redness, defined at times as a sharply circumscribed, pinkish flush, due to distention of the minute capillaries, extending quite to the lower eyelids, which may, as in Ball's cases, be wrinkled, boggy, and swollen. The eyes, for this reason, seem smaller and more widely separated. In consequence of the swelling and immobility of the features, the facies is characteristic: the broad, thick nose; swollen, pendulous, or even everted lips; expressionless eyes, and leathery cheeks producing upon the observer the impression of a mask. The skin of the other regions of the body participates in these changes, the backs of the hands, for example, becoming wrinkled or distended; the palms dry and fissured; the feet participating in the same morbid process. The hair becomes harsh and falls in nearly 90 per cent. of cases, even to the production of extreme baldness. The nails become discolored, grooved, and cracked, and the teeth often carious, fragile, or wholly lost. The mucous membrane of the mouth (gums, palate, pharynx) becomes tumid and fungous.

In the triangles at the side of the neck, and also posteriorly, are "bolsters" of fat. Pigment-alterations readily occur; moles increase in size; and the general tint of the skin may vary from that of dry parchment to the hue in Addison's disease. The gait is waddling and uncertain. The thyroid gland atrophies. Anesthesia is of common occurrence. The tongue, uvula, and fauces are often so thickened and

¹ Trans. Clin. Soc., London, 1874, vii, p. 180. Also see Hun, *Amer. Jour. Med. Sci.*, 1888, p. 196 (notes on 150 cases in literature). For late reports, see Adami, *Trans. Fourth Cong. Amer. Phys. and Surg.*, 1897 (review of subject and bibliography); Murray, *Lancet*, 1899, i, pp. 667 and 747; and Howard, *Jour. Amer. Med. Assoc.*, 1907, xlviii, pp. 1226, 1325, and 1403 (historical, clinical, and pathological description, (with case reports).

immobile as to make speech slow and indistinct. The temperature is usually subnormal, the mental faculties seriously impaired, the sight and hearing altered, digestion vitiated, and the muscular strength greatly reduced.

The course of the disease is chronic, lasting for years, and terminating usually in a state of *marasmus*, with fatal issue.

Etiology.—The cause of myxedema is imperfectly understood, though its association with the abolition of the thyroid gland (by pathological change or ablation) is generally admitted. Stokes reports ten cases of acute myxedema following thyroidectomy. In these cases, beside the rapid occurrence of the symptoms enumerated above, there were convulsive seizures of an epileptiform character. Of four hundred and eight complete thyroidectomies analyzed in the Clinical Society's report, in sixty-nine myxedema developed. The result did not occur when part of a gland was left. The influence of heredity is distinctly shown in cases reported by Ball, Ord, Saville, and Taylor. The disease affects women more often than men, in the proportion of seven to one. Children are attacked, but the malady is more common in individuals between thirty-five and fifty years of age.

Pathology.—In nearly all cases examined the thyroid gland is found to be markedly reduced in size and its glandular structure seriously impaired by substitution of fibrous connective tissue for the epithelial cells lining its secreting acini. At first there is a small round-cell proliferation, which gives place to changes resulting eventually in a firm thickening of both the gland and its capsule. The lumen of the arteries becomes obstructed; and, in certain cases, new-formed lymphatic tissue is found surrounding the atrophied lobules.

Examination of affected regions of the skin discloses slight epidermal atrophy, replacement of connective-tissue trabeculae with fine nucleated fibrillae, a small-cell infiltration in the upper part of the corium, and an endarteritis obliterans similar to that recognized in the thyroid gland. The epithelium of the coil and sebaceous glands is the seat of swelling and proliferation, which eventually produce occlusion of the lumen of these emunctories and explain largely the cutaneous symptoms of the malady. The hair-follicles and the nerves (fibrosis of hair-pouch, perineuritis) may or may not be invaded by a similar process.

Diagnosis.—Cases of myxedema are readily distinguished from those of elephantiasis by the generalization of the symptoms, the nervous state of the patient, the fat-deposits, and the condition of the thyroid gland. Acromegaly involves the bones; in lepra there are commonly anesthetic symptoms or characteristic tubercles.

Treatment.—The treatment of myxedema has hitherto aimed at amelioration of the symptoms by the employment of roborant and tonic measures; alkaline and sulphur baths; electricity and massage. The later method of treatment, however, is by thyroid-grafting, by administration of thyroids, and by hypodermatic injection of from 5 to

15 minims of liquid glycerin extract.¹ Whether there be employed the thyroid gland itself, the liquid extract, or the desiccated extract in tablet form, the results are satisfactory in so large a proportion of cases that the prognosis of this group of disorders presents no longer an element of gravity. The headache, faintness, loss of weight, neuralgias, and even albuminuria, with other symptoms immediately following the employment of the thyroids named above, do not seem to have an adverse influence upon the remoter benefits received from the treatment.

DERMATOLYSIS.

Synonyms.—Chalazodermia, Pachydermatocele, Cutis Pendula, Lax Skin.

FIG. 117



Diffuse and disseminate dermatolysis. (Fred Wise and E. J. Snyder.)

¹ Cf. "Feeding Thyroids in Myxedema," by J. J. Putnam, Amer. Jour. Med. Sci., August, 1893.

There appear to be two well-differentiated disorders described under the above title, one form corresponding closely with the fibromata, and being so classed by Crocker and others; while the other presents chiefly a congenital abnormal laxation of the skin. In the fibroma

FIG. 118



Diffuse and disseminate dermatolysis. (Fred Wise and E. J. Snyder.)

variety, the masses of pendulous skin may depend from the face, neck, arms, and other situations, and may be associated with other molluscum tumors or occur independently (*Cf.* Fibroma Pendulum). Of interest in this connection is the report of a case by Wise,¹

¹ Jour. Cut. Dis., 1914, xxxii, p. 139.

under the title, "Diffuse and Disseminate Dermatolysis;" a condition closely related to molluscum fibrosum, according to this writer. The case presented an eruption of slightly raised, pinhead- to pea-sized, soft, wrinkled, irregularly rounded, papular elements, discrete and grouped, and also areas of pigmentation. The chief sites were the back, the sides and back of the neck, and the posterior surface of the arms. Histologically, there was found a myxomatous connective-tissue new-growth.

In the other type of cases considered under this heading (*elastic skin, cutis hyperelastica (Unna)*), the skin of patients affected is in a condition resembling that of the young of several among the lower animals (pups of large hounds, etc.), where enormous flaps of skin may be gathered up between the fingers and extended a foot or more from the underlying tissues. On releasing such folds, the skin retracts to its former position. The skin is usually thickened, but it may be stretched for a considerable distance; as, for example, the skin from the surface of the chest may be made to cover the entire face. Its color may be normal or hyperpigmented. In other respects no changes are noted. Usually, all the functions of the integument are preserved. The anomaly is congenital, but may be exaggerated, as in the case of freaks. Remarkable examples of this condition have been recorded by Duhring,¹ Crocker,² and others.

In a histological study, Unna (p. 984) and Williams found the elastin altered only in that it presented a more wavy course of the fibers, and they were longer, as the result of constant stretching. The collagen showed absence of the broad bundles in the deeper layers, and their place was taken by smaller and longer fibers. Both the larger blood-vessels and fine capillaries, as well as the nerves, showed an abnormally winding course. The capillaries, the lymph-vessels, and lymph-spaces were dilated, and the vessels frequently showed a leukocytic perivascular infiltration. The sebaceous glands were more voluminous than normal; the muscles were also increased in number. They conclude that the condition may be explained by the increase of the muscles, the winding condition of the vessels, and the absence of the broad bands of connective tissue usually found deeply situated.

CUTIS VERTICIS GYRATA (UNNA).

This condition was originally described by Jadassohn,³ and later by Unna,⁴ who gave it the above title. Subsequent cases have been recorded by Pospelow,⁵ Veress,⁶ Audry,⁷ Bogrow,⁸ Vörner,⁹ and others.

¹ Dis. of the Skin, 3d ed., p. 420.

² Dis. of the Skin, 3d ed., p. 949.

³ Verhandl. d. Deuts. Derm., Qs. ix, Kong. su Bern, s. 452.

⁴ Monatshefte, xlv, p. 227.

⁵ Russ. Zeit. f. Haut., 1909, xviii, p. 7.

⁶ Zeitschrift, xv, p. 675.

⁷ Annales, 1909, p. 257.

⁸ Monatshefte, 1910, I, p. 16.

⁹ Derm. Wochenschr., 1912, liv, p. 309.

The disorder is characterized by furrows occurring in the scalp, over the crown and back of the head, presenting a condition which roughly suggests the convolutions of the cerebrum. There may be a few up to twelve or fifteen or more furrows in an individual case. In some of the recorded cases inflammatory processes have preceded the condition, while in others no such history was obtained.

The etiology is not known. Some observers view the disorder as a congenital affection developing later in life; others as a disorder due to inflammatory processes induced usually by microorganisms. Bogrow believes the condition to be a congenital tendency to furrowing, intensified by subsequent infection.

CLASS IV.

ATROPHIES.

ATROPHIA SENILIS.¹

Synonyms.—Senile Atrophy of the Skin, Atrophoderma Senile.

Definition.—This is the frequently recognized cutaneous degeneration peculiar to old age. The skin becomes colored in various shades of brown, either uniformly or in tolerably distinct pea- to bean-sized maculations over the face, the dorsum of the hands, the genitalia and the anus, and the lower extremities.

Symptoms.—The skin assumes a dull-yellowish hue, is seamed with furrows and wrinkles, is dry and inelastic, may desquamate slightly, and, losing the cushion of fat upon which it rested in earlier life, is either readily raised from the subcutaneous structures or depends from them in loose folds. The hairs on the affected areas may fall or may undergo regressive changes to the lanugo type. Pea- to finger-nail-sized, verruciform, dirty-yellowish accumulations of sebum and epidermis become visible, often in numbers, on the face and elsewhere. soft and readily scraped from the surface, or firmly adherent and scaly; or there may be small, pendulous, shrivelled pouches, representing fibromata that have disappeared. These epithelial growths, especially when irritated, are not infrequently the beginning of malignant epithelioma. Occasionally, they are commingled with whitish and grayish maculations or pinhead-sized and larger telangiectases.

In quantitative senile atrophy the pathological changes include a general thinning of both corium and epidermis, as a result of which their characteristic interdigitations largely disappear; an increased pigmentation in the rete; a shortening of the hair-follicles; a dilatation of the sebaceous and coil-glands, the mouths of which often become blocked with epithelial detritus; the obliteration of some vessels and the dilatation of others; and the disappearance of the fat-cells from the meshes of the connective tissue.

In degenerative atrophy there may be fatty, amyloid, vitreous, and other changes of one or of several elements of the skin. Neumann described a senile atrophy with a granular degeneration and a vitreous swelling of the connective-tissue fibers. Schmidt, Reizenstein, and Unna think these changes due to a peculiar arrangement of the elastic fibers and their partial degeneration into *elacin*, or, in combination with the collagen, into *collastin* and *collascin* (Unna). These changes in

¹ For bibliography, see Himmel, Archiv, 1903, lxiv, p. 47.

the elastic fibers are manifested through the peculiar staining qualities of the latter, and in the light of modern technique are exceedingly interesting, as they occur not only in atrophy, but also in other cutaneous disorders.

Treatment.—Senile atrophy cannot be remedied, but it may often be prevented or postponed by securing for the skin and for all the tissues of the body the best possible nutrition and hygiene, and by protecting the skin from exposure to cold and other harmful influences. The nutrition of the skin may often be improved by the proper use of bran- or salt-baths, massage, electricity, or inunctions of oil. Cod-liver oil or other fats may usually be added to the diet with advantage. Care must be taken to protect all warty and other epithelial growths from irritation, with a view to the prevention of malignant changes. (See also *Keratoses Senilis*.)

DIFFUSE IDIOPATHIC ATROPHY OF THE SKIN.¹

This disorder, described under many titles, occurs, as a rule, on the limbs, chiefly the lower, extending from the dorsal surface of the feet to the knees, and at times on the hands, forearms and arms, including the shoulders. It rarely involves the face. The extensor surfaces of the limbs are most markedly involved. The lesions have a tendency to be symmetrical, but several instances are recorded of their appearance on one side only.² In fully developed cases the skin presents a red, bluish-red, dark-red, or brownish-red, thin, atrophic, wrinkled appearance, in many cases likened to crumpled cigarette paper, or it may have a parchment-like, translucent look. Through it the superficial veins and tendons are visible. In some cases branny or flaky scaling is present, the skin being loose, easily movable, with the wrinkling most marked over the knees, elbows, and dorsal surfaces of the hands. In the earlier stages, red or bluish-red areas of varying size appear, which enlarge, new patches gradually developing, and by coalescence forming diffuse areas. In many cases the dorsum of the hand, the elbows, and the knees have been the initial site. In rare instances, inflammation and edema may occur. In other instances, the skin, instead of being lax, is tense, its surface smooth or

¹ For case reports, discussion of findings, classification, and full bibliography, see Buchwald (*Archiv*, 1883, p. 553); Herxheimer and Hartmann (*Archiv*, 1902, lxi, p. 57); Herxheimer (*Jour. Cut. Dis.*, 1905, xxiii, p. 241, with particular discussion on differentiation between acrodermatitis and scleroderma); Herxheimer and Schmitt (*ibid.*, 1911, xxix, p. 257. Further discussion on differentiation of scleroderma); Finger and Oppenheim (*Die Hautatrophien*, Wien and Berlin, 1910); Kanoky and Sutton (*Jour. Cut. Dis.*, 1909, xxvii, p. 556. A comparative study of acrodermatitis chronica atrophicans and diffuse scleroderma with associated morphea atrophica, with bibliography); Irvine (*Trans. Sec. on Derm., Amer. Med. Assoc.*, 1913, p. 133. A case report with histology, illustrated with 4 clinical and 8 histological cuts; with thorough discussion of idiopathic atrophy of the skin relative to classification, etc. Many references); Wise (*Jour. Cut. Dis.*, 1914, xxxii, p. 295. Thorough report of a case, clinical and histological, with discussion and extensive bibliography).

² Cf. Pollitzer, *Jour. Cut. Dis.*, 1913, xxxi, p. 424. (Case demonstration. Lesions limited to one limb from ankle to thigh, preceded by a stage of infiltration.)

rough, and yellowish-white in appearance, with a zone of reddish-brown discoloration. In these cases resemblance to scleroderma is marked. Not infrequently the two disorders coexist.¹ In the affected areas the hairs are lost, and the physiological processes, such as sweating, are greatly diminished or absent. The subjective symp-

FIG. 119



Acrodermatitis chronica atrophicans.
(Fred Wise.)

FIG. 120



Acrodermatitis chronica atrophicans.
(Fred Wise.)

toms are not marked; early there may be some itching or burning. Some of the cases described in the literature are examples of atrophic scleroderma, while others present atrophic changes due to syphilis.²

¹ Kingsbury, Jour. Cut. Dis., 1907, xxv, p. 414: Idiopathic atrophy and scleroderma in the same patient. This patient, exhibited seven years later, showed same condition, somewhat more advanced. Gottheil, *ibid.*, 1914, xxxii, p. 586. Trimble, *ibid.*, 1914, xxxii, p. 572: Acrodermatitis chronica atrophicans and scleroderma in the same patient.

² Fordyce, Jour. Cut. Dis., 1900, xviii, p. 462; *ibid.*, 1904, xxii, p. 155 (with references). Ravogli, Jour. Amer. Med. Assoc., 1903, xl, p. 73. Howard Fox, Jour. Cut. Dis., 1913, xxxi, p. 345 (unilateral case, hand and arm, with a positive Wassermann reaction).

In 1910 Herxheimer and Hartmann reported a group of twelve cases, with others taken from the literature, characterized by local atrophy, which was always preceded by inflammatory reaction. To this group they gave the name *Acrodermatitis chronica atrophicans*. In these cases the process began, as a rule, on the dorsal surfaces of the fingers or hand and spread upwards over the forearms and neck, rarely involving the face. The development does not necessarily include a continuous extension, as in many instances new lesions occur at a distance. The earliest change is a soft infiltration and thickening, of purplish-red color, or, as described later (1905) by Herxheimer, as tumor-like formations, characterized by nodules, deeply situated, of light- or dark-red color, and only moderately elevated. The infiltrations are raised, but not sharply outlined, and they gradually fuse into the normal surrounding skin. The sites of election are the hands, forearms, and elbows. After months or years, the affected areas (both infiltrations and tumor-like formations) undergo atrophic changes, becoming pale or yellow, thin, wrinkled, and presenting all the signs of the idiopathic atrophy above described. The clinical characteristics of this form which distinguish it are, therefore, the early, soft infiltrations and nodules, which are later succeeded by atrophy, both processes at times being coincident.

*Erythromelie*¹ (Pick) and *erythema paralyticum* (Neumann) are now recognized as idiopathic atrophy of the skin in the earlier stages.

Etiology.—The disease has been noted more frequently in females than in males, and usually occurs about the fortieth year of life. It is recorded as occurring from the fifteenth to the sixty-eighth year. The essential cause of the disease is unknown, although a process practically identical is not infrequently produced by syphilis, and also by scleroderma. Trauma, temperature-changes, exposure to heat and cold, and sudden chilling of the surface have all been noted as factors. Irvine's extensive case occurred in a blacksmith.

Pathology.—In the terminal stages all varieties show a similar structure, which includes marked atrophy of the epidermis and of all the structures of the corium, particularly the elastin. In the variety described as *acrodermatitis chronica atrophicans*, in the early stage the epidermis shows some hyperkeratosis. In the corium the reticular layer presents a cellular infiltration of connective-tissue and mast-cells, the papillary layer being similarly involved but to a less degree. The blood-vessels show inflammatory changes, with a perivascular cellular infiltration in localized areas. In the areas of infiltration the elastin is reduced and shows degenerative changes (granular and fragmentation). In the atrophic stage the rete is greatly thinned and its basal layer hyperpigmented. In the corium the papillæ are usually effaced, and there is present a more or less diffuse cellular infiltration.

Diagnosis.—The chief difficulty is to distinguish *acrodermatitis chronica atrophicans* from scleroderma. In typical cases, in the early

¹ Über Erythromelie (Pick), Klingmüller, Archiv (Festchr. Kaposi), 1900, p. 629.

stages, the soft infiltrations of reddish or purplish-red color of the first-named disorder are readily distinguished from the harder, whitish or yellowish infiltrations of scleroderma. In the final stages, the wrinkled, loose, somewhat scaly, atrophic skin in the one differs from the smooth, scar-like atrophy, which is hard and bound down, in the other. Atypical cases are practically indistinguishable both clinically and histologically.

Prognosis and Treatment.—The disease progresses to a certain point and then remains stationary. Except in rare instances, the general health is unaffected. The normal skin cannot be restored, hence the treatment resolves itself into that indicated by the individual case, both as to general and local management.

ATROPHIA MACULOSA ET STRIATA.

Synonyms.—Atrophic Spots, Atrophoderma Striatum et Maculatum. Fr., Vergetures.

Definition.—In the disease described under the above title, the atrophy occurs most frequently in linear, cicatriform, often parallel, striæ or streaks, a centimeter or more in length, developing chiefly about the hips, buttocks, and upper portions of the thighs in persons of both sexes and adult years. Less frequently, these striæ are observed upon the neck, the trunk, and the extremities. They are insidious in development and indelibly persistent, and appear as sensibly thinned, glistening, and often depressed lines or furrows, having a whitish hue, with an occasional blending of a very delicate purplish tint. They are usually multiple and at times abundantly displayed, running in various curves, for the most part at angles with the long axis of the body. They occasion, as a rule, no subjective sensations. More rarely, the atrophic areas occur in macular patches. The lesions are then fewer, more isolated, and are discovered more frequently upon the extremities, but also upon the trunk, varying in size from that of a coffee-bean to that of a chestnut. This form of atrophy often succeeds either an erythematous or a pigmented condition, which very slowly changes until there is formed a dead-white, round or oval, often insensitive patch, more or less depressed, resembling roughly in certain instances a vaccine cicatrix. These areas usually show a partial or complete alopecia.

The forms of cutaneous atrophy described under this title may be divided into idiopathic and symptomatic varieties. In the latter, atrophy in its simplest form may result from traumatism: the persistent marked symptoms left on the skin, for example, by a lash with a whip, insufficient to wound the epidermis, but capable of injuring the deeper elastic tissue; or from slow pressure of tumors (ovarian, uterine, mesenteric), by which the skin is distended. The atrophic lines, first of a violet tint, later becoming dead-white in hue, running in various directions according to their location on the body, follow distention and stretching of the skin. In pregnancy these lines occur

over the abdomen (*lineæ albicantes*, *lineæ gravidarum*), and in obese individuals over the same area, and in addition in the latter over the hips and various other portions of the body. Many examples occur where the causes above noted are not operative, and these may properly be considered as idiopathic. Two cases have been described by Féré and Quemonne.¹ In one of these there appeared minute, whitish, elongated cicatrices, about which there was a marked pigmentation of the skin. The lesions were abundant in the lumbar region. In the second case, the lesions began as lines, brownish- or bluish-red in color. As they became older, the color faded, until eventually it presented a dead-white hue. They were situated over the breast, throat, a few in the lumbar region, and over the upper part of the buttocks. There was none over the abdomen, groins or thighs, in the regions where over-distention is the usual cause.

Adamson² described a marked case of macular and striate atrophy occurring in a patient suffering with tuberculosis of the lungs and lichen scrofulosorum, and another³ extensive macular case, in which the trunk, neck, arms, elbows, and thighs presented numerous oval, finger-nail-sized, whitish, bluish, atrophic macules. This patient was suffering with nephritis. Sections of the skin showed a well-marked cellular infiltration around the blood-vessels and a total loss of elastic tissue.

Shepherd⁴ described a group of cases of macular and striate atrophy following typhoid fever. The characteristic lesions were described as occurring about the knees, in which situation, both above the knee and over the patella, the striæ were well marked, purplish in color, elliptical in shape, tapering to a fine point at each end, and in direction transverse to the axes of the limb and parallel to one another. The largest stripe was about 6 inches in length and 1 inch in breadth at its central portion. Shorter parallel stripes and bands occurred in the vicinity. On one side there were five stripes of various lengths and widths, some being merely lines. In addition to the colored stripes, there were several depressed spots of shiny skin, from pea- to bean-sized. On standing, the purplish color became deepened and the lesions resembled the scars following burns. The skin was smooth and glistening, puckered transversely, and devoid of hairs. There was no change in subjective sensations. The skin felt dry, and a sense of depression was indicated to the finger. On flexion of the knees, the striæ presented a depressed appearance. According to Shepherd's further observation, these lesions did not present a stage of hypertrophy. Their first appearance was indicated as shiny, depressed, cicatricial-looking spots, which gradually enlarged. Several appeared to coalesce and by uniting formed a stripe. The color early was reddish, later purplish-blue, still later of a lighter color.

¹ Le Progrès méd., 1881, ix, p. 837.

² Brit. Jour. Derm., 1910, xxii, p. 350.

³ Ibid., p. 351.

⁴ Jour. Cut. Dis., 1891, ix, p. 59 (describes his case and discusses others of similar type in the literature).

Bunch,¹ under the title *Striæ patellares*, described two cases presenting symptoms similar to the above, each case following typhoid fever.

Idiopathic macular atrophy has been recorded by a number of observers. Duhring² describes this condition as beginning in the form of erythematous spots or lines of rose or violaceous tint, made up of hyperemic capillaries, which sooner or later are succeeded by the atrophic changes described above. He quotes Wilson, Liveing and Taylor as having reported similar instances and calls attention to the similarity of some of these to morphea. Jadassohn³ described an extensive macular case, with lesions varying in size from that of a lentil to a shilling, occurring chiefly over the extensor surfaces of the limbs; and Heuss⁴ describes a similar case. Grindon⁵ describes a case with dime-sized atrophic white spots on the back, chest, abdomen, and hip, associated with hyperpigmentation and vitiliginous spots.

Macular atrophy is described in connection with many disorders. Its connection with lupus erythematosus has been the subject of much discussion. That some cases reported are the results of lupus erythematosus⁶ there seems to be no doubt, and also that some of the reported cases are examples of guttate morphea. In the early stages of the latter disorder no difficulty is experienced, clinically or histologically, in recognizing the disorder. In the stage of atrophy, the conditions are practically indistinguishable. In addition, small atrophic spots occur as sequels in syphilis, lupus, atrophic lichen planus, and other diseases.

Congenital atrophy may be diffused or localized, the latter being most frequent. The disorder appears to be rather a congenital defect than an atrophy. When occurring in the scalp, the lesions are present at birth, and consist of slightly depressed, smooth, bald areas, coin-sized and larger, having well-defined borders. In the case described by Rihel and Vörner,⁷ they found on microscopical examination that the epidermis was greatly thinned, that the corium also presented atrophic changes, the papillary layer and muscles being poorly developed, while the sebaceous and coil-glands and hair-follicles were absent.

Etiology and Pathology.—In what has been stated above, the causes of the various atrophies, so far as known, have been indicated. The most constant histological change occurs in connection with the elastin. In the distention cases it appears to be ruptured. In other cases it shows great degenerative changes and is reduced in amount

¹ Brit. Jour. Derm., 1905, xvii, p. 1 (with references pertaining to these cases).

² Diseases of the Skin, 3d ed., p. 442.

³ Verhandl. der deutsch. dermat. Gesellsch. Congress, 1891.

⁴ Monatshefte, 1901, xxxii, Nos. 1 and 2; abstr. Brit. Jour. Derm., 1901, xiii, p. 198 (a comparative study, with classification).

⁵ Jour. Cut. Dis., 1913, xxxi, p. 270.

⁶ Little, Brit. Jour. Derm., 1911, xxiii, p. 250 (case demonstration of macular atrophy associated with lupus erythematosus). For discussion of the connection of lupus erythematosus with macular cutaneous atrophy, Cf. Vignolo-Lutati, Monatshefte, 1907, xlv, pp. 329 and 404. A brief abstract is given in the Jour. Cut. Dis., 1908, xxvi, p. 192.

⁷ Archiv, 1903, lxvi, p. 407.

or completely obliterated. The remainder of the structures of the skin also show atrophic changes in varying degrees.

Prognosis and Treatment.—The scars are irremediable and no specific treatment can be outlined.

GLOSSY SKIN.

Synonym.—Atrophoderma Neuritica.

This condition was first described by Paget,¹ and subsequently by Mitchell, Morehouse and Keen, in their experience with injuries occurring in the Civil War. It consists in peculiar atrophic changes occurring in the fingers. Paget's original description, quoted by Mitchell,² is as follows: "Glossy fingers appear to be a sign of a peculiarly impaired nutrition and circulation, due to injury of the nerves. In well-marked cases, the fingers which are affected are usually smooth, hairless, almost void of wrinkles, glossy, pink, ruddy, or blotched as if with permanent chilblains. They are commonly, also, very painful, especially on motion, and pain often extends from them up the arm. In most cases this condition of the fingers is attended with very distinct neuralgia, both in them and in the whole arm." In addition to the symptoms above described, vesicles and bullæ are observed in the skin, together with ulceration. The skin is usually dry, but in certain cases quite a marked hyperidrosis may occur. The nails are changed in a characteristic manner, being curved both longitudinally and transversely, and in some cases considerable thickening occurs beneath the free end. The skin may retract sufficiently to expose the nail-matrix. About the toe-nails ulceration occurs, and there is also a certain amount of deformity.

Etiology and Pathology.—The disorder occurs following injury to the nerves, when they are either partially severed, as in a gunshot wound, or a neuritis is subsequently set up. It has also occurred in maculo-anesthetic leprosy, in gout, and in rheumatism. The disorder is properly classed among the trophoneuroses, and is dependent upon the inflammatory condition of the nerves supplying the affected part. Turney³ states that the vaso-dilators are specially involved, which is shown by the hyperemic condition of the skin and the profuse sweating occasionally noted in the affected areas.

Treatment and Prognosis.—The condition tends to spontaneous recovery, and in the interim protection from external injury and from extremes of heat and cold is necessary. The pain is usually relieved by cold, sometimes hot, applications. In certain cases, where intense pain is present, complete severance of the nerve has been found necessary.

¹ Med. Times and Gazette, 1864, i, p. 58.

² Turney, Allbutt and Rolleston's System, 1910, vii, p. 82.

³ Loc. cit.

PERFORATING ULCER OF THE FOOT.

Synonyms.—*Malum Perforans Pedis.* Fr., *Mal perforant du pied.*

This disorder was first named by Vesigné, and has been thoroughly studied by Savory and Butlin,¹ Gasquel,² and others.

FIG. 121



Palmar keratoderma. (Foot of same patient is shown in Fig. 122.)

FIG. 122



Perforating ulcer of the foot, with palmar and plantar keratoderma. (From a water-color sketch.)

Symptoms.—The disorder occurs on the feet, over points of pressure, usually the first or fifth metatarso-phalangeal joint. The first objective symptom is a proliferating thickening of the epidermis, like a corn, usually single, occasionally multiple. Inflammation and suppuration occur beneath this thickening, spreading downward through the soft parts, occasionally to the bone. Gradually a sinus forms, reaching from the side of the corn to the deeper parts involved. When fully developed, the lesion consists of an ulcer or sinus, the

¹ *Med. Chir. Trans.*, 1879, lxii, p. 373.

² *Thèse de Paris*, July, 1890; a *résumé* of ninety-one collected cases.

surface of which is covered with a growth of granulation-tissue, surrounded by a thick, horny collar. There is little discharge from the sinus, and it is unaccompanied in most cases by subjective symptoms; anesthesia of the surrounding parts is the rule. Occasionally, there is hyperesthesia, and at times a marked hyperidrosis of the part. In rare instances the palm may be similarly involved.

Etiology and Pathology.—The exciting cause of the disorder is local injury by pressure in an area which presents a lessened innervation, either from disease of the spinal cord, as in locomotor ataxia, or the peripheral nerve, as in syphilis, leprosy, or other causes of neuritis. Gasquet¹ found that in 69 out of 91 cases there was a central nervous lesion, in 8 a peripheral nerve lesion, and 14 were diabetic. Of the 69 central nervous lesion cases, 32 had tabes, 17 general paresis, 8 symptoms of alcoholism, 4 traumatic disease of the cord, 8 various cord lesions, and one Friedreich's disease. Of the 91 cases, 84 were males. Of 79 cases 3 were under twenty years of age, 4 between twenty and thirty, 22 between thirty and forty, 31 between forty and fifty, and 19 over fifty. Thomasczewski² recorded 10 cases associated with tabes, leprosy, diabetes, or cerebral or spinal disease, the location, character, and course of the ulcers being practically the same in all cases. He believes the ulcers are due to trophic changes in the tissues, resulting from systemic disease, usually that of the central nervous system, though the local anesthesia and pressure are undoubtedly etiological factors.

Diagnosis.—The disorder is to be differentiated from simple callosities which have become secondarily infected, the absence of anesthesia and other evidence of nerve-derangement readily establishing the distinction.

Treatment.—The treatment is unsatisfactory. Rest of the part, with curettage of all the diseased tissue, will frequently cause the ulcer to heal, but it immediately recurs after the patient begins to use his feet. Amputation is unsatisfactory, recurrence in the stump being not infrequently noted.³ The systemic disease should receive appropriate treatment, and mechanical devices to prevent the use of the foot are to be advised in most cases.

Prognosis.—The prognosis is doubtful.

MULTIPLE BENIGN TUMOR-LIKE NEW-GROWTHS OF THE SKIN.

Under this title Schweninger and Buzzi⁴ describe a condition examples of which have since been seen by Morris, Colcott Fox, Van Hoorn,⁵ and Stelwagon.⁶ The lesions described in these cases are bean-to small- coin-sized, bluish-white or slate-tinted, bladder-like formations, with delicate telangiectases over the surface of some. By pressure

¹ Loc. cit.

² Münch. med. Wochenschrift, 1902, xlix, pp. 779 and 840.

³ Cf. Lapowski, Jour. Cut. Dis., 1909, xxvii, p. 183.

⁴ Internat. Atlas of Rare Skin Dis., 1891, v, Plate XV.

⁵ Quoted by Crocker, 3d ed., p. 702.

⁶ 7th ed., p. 667.

most of them can be forced into a hollow point in the underlying tissue, the tumor returning like a ventral hernia on removal of pressure. The smaller lesions are rounded and elastic, but as they become older they flatten and become darker in color, harder, and less resilient. They undergo spontaneous involution, leaving flaccid, pitted scars.

The lesions are found chiefly over the back, shoulders, and arms, and occasionally on other areas. The course of the disease is slow, new lesions gradually developing as older ones undergo involution. They are unaccompanied by subjective symptoms, and have no effect on the general health. In sections excised from the skin, Buzzi found an absence of elastic tissue in the affected areas, with slight increase of its fibers at the margins, and round-cell infiltration was noted about the superficial blood-vessels and glands of the skin. Crocker states that he has seen similar lesions associated with cutaneous fibromata after their absorption. The microscopic picture is that seen in cutaneous atrophy.

The treatment so far employed has had no effect on the growths.

MORVAN'S DISEASE.

Synonyms.—Syringomyelia, Analgesic Paralysis with Whitlow. Fr., *Panaris analgésique*.

Definition.—Morvan's disease is a paretic affection of the spinal cord, chiefly involving the upper extremities, accompanied by pain, and producing a series of whitlows, affecting first one side of the body and then the other.

Symptoms.—In this disorder the arm is commonly first involved, the approach of the disease being insidious and usually first noticed on account of the production of pain and some loss of nervous and muscular power. At times the first sign of involvement is the production of whitlows, which, either early or late, in every case are tolerably sure to appear. In other instances the disease first displays an analgesia similar to that occurring in some subjects of lepra, and attempts have been made to establish a relation between the two diseases.¹ In time atrophy of the interosseous muscles, of the flexors of the wrist, and of the tissues forming the thenar and hypothenar eminences may result. The integument of the affected limb has a bluish or empurpled look; it may be thinned or thickened, and the seat of fissures, vesicles, and bullæ, as well as of the characteristic whitlows, which vary in number from two to four or six. Ulceration, extending as deeply as to the tendinous sheaths, may result, and, as a consequence of one or more of the changes described above, the phalanges may necrose and be separated from the hand.

Trophic changes arise in connection with the disease, pointing for the most part to an origin in disturbances of the central nervous

¹ Zambaco, Trans. First Internat. Leprosy Congress, Berlin, 1889; Dyer, New Orleans Med. and Surg. Jour., 1893, xxi, p. 81; and Calderone, Giorn. ital., 1901, vi, p. 756 (includes survey of the subject and bibliography).

system. Among these disturbances may be named: hyperidrosis; diminution of, variability in, or complete absence of the reflexes; visual changes; contracture of the fingers; and a general distortion of the hand. Scoliosis and arthritic complications have been recorded in a number of cases.

The disease is usually protracted in its course, lasting in some cases for a quarter of a century.

Etiology.—The affection may develop first in childhood and last until middle life and longer, though more often it is first noticed after the occurrence of puberty. Women are much less often affected than men. Traumatism, malaria, and rheumatism have all been cited as possible causes of the disease. Its exact etiology is obscure.

Pathology.—Neuritis and thickening of the neurilemma have been discovered in the nerves distributed to the affected parts; as also sclerosis of the posterior cornua and columns of the cord. The cavities recognized in the central canal, distended with fluid, are supposed to be due to absorption of gliomata.

Diagnosis.—The recognition of a fully-developed case of Morvan's disease is readily established by taking into consideration the parietic symptoms present, the whitlows, and the perversions of sensation, more particularly in appreciation of temperature-changes, pain, and contact with foreign bodies. Attention has already been directed to the striking resemblance between certain phenomena of anesthetic lepra and those of syringomyelia. Scleroderma and glossy fingers are to be differentiated by the special peculiarities of each.

Treatment.—Treatment is to be conducted on the general principles, surgical and medical, relied upon for meeting the indications of each case. In general, the hygienic and dietetic management of the patient, with a highly roborant regimen, is conducive to recovery. Many of the subjects of the disease have been reported as relieved or even wholly cured.

KRAUROSIS VULVÆ.¹

The rare and curious condition to which this name was first given by Breisky, in 1885, is now generally recognized under the title given it by him, though Weir, of New York, first described the disorder as an ichthyosis, and was followed by Tait, who described a similar condition. Recently Thibierge, after a large experience, described the disease in its several types, four of which are as follows: (1) a white form, leucoplasic; (2) a red or inflammatory form; (3) a senile form; and (4) a post-operative form. The clinical features of the disease are commonly striking.

¹ Weir, *New York Med. Jour.*, March, 1875; Tait: *Serpiginous vascular degeneration of the nymphæ*, 1877; Breisky, *Zeitschr. f. Heilkund*, Prag., March 15, 1885; Heitzman, *Trans. Amer. Derm. Assoc.*, 1888, p. 64; Martin, *Centralb. für. Gyn.*, 1894, xiii, pp. 310, 323 and 394; Reed, *Amer. Gyn. and Obstet. Jour.*, New York, 1894, v, p. 556; *ibid.*, *Treatise on Diseases of Women*, 1913, p. 702; Veit, *Handbuch der Gyn.*, 1898, Bd. iii, p. 145; Jayle, *Rev. de Gyn. et de Chir. abdom.*, July-August, 1906, p. 633; Thibierge, *Annales*, 1908, ix, p. 1; Baldy and Williams, *Amer. Jour. Med. Sci.*, cxxviii, p. 528.

Symptoms.—Most of the patients are women either of advanced years or at the menopause, or younger women who have suffered ablation of the uterus or ovaries. The earliest change, according to Reed, is the occurrence of small, reddish areas around the ostium vaginæ. These are depressed, painful to the touch, and soon the vaginal orifice is narrowed, the elasticity of the tissues diminished, and the skin becomes pigmented, thin, translucent, tense, and glossy, with the natural folds obliterated. In well-developed cases many changes are noted. The parts may be symmetrically or irregularly involved, the labia majora appearing to have been obliterated when the disease is at its height, the labia minora absent or fused indistinguishably with the adjacent tissues; and the shrunken genitalia—the nymphæ, the clitoris and its hood, the vestibulum, and the entire vulvar ring—are eventually involved, producing a characteristic atrophy of the entire organ. In some cases the parts are whitish and dry; in others the skin is furrowed, wrinkled, pitted, spotted, or scale-covered. In yet others the subcutaneous vessels become visible beneath the thinned and glazed epidermis. The color of the retracted tissues may be whitish, reddish, pinkish, yellowish, or even bluish. In almost all types of the disease the retracted tissues have a thoroughly characteristic glistening aspect, shining as if varnished. Several cases have been under our observation. In two of these (Dr. Hyde's) carcinoma subsequently developed. In some others, lesions strongly suggestive of leucoplakia were present. Jayle, discussing the relation of leucoplakia to kraurosis, calls attention to the absence of any tendency to retraction in the pure types of leucoplakia, yet believes that the two affections may coexist. The disease is frequently preceded and accompanied by intense itching, yet this symptom has been absent in a number of reported cases, and in certain cases a loss of cutaneous sensibility is noted. In practically all cases a catarrhal discharge is noted. The atrophy in certain cases has been preceded by inflammatory changes, suggesting an eczema.

Etiology.—The cause of kraurosis vulvæ is not known. A preceding inflammatory condition, a specific chronic catarrh of the mucous tract, gonorrhea, and extirpation of the uterus (Olshausen, cited by Reed) are all given as etiological factors. In cases associated with itching, the scratching and resulting traumatism are cited as effective in its production. Reed states that the peripheral trophic nerves or their ganglia are to be considered the origin of the disease.

Pathology.—Veit, Martin, and Baldy and Williams agree in believing that kraurosis vulvæ is a purely inflammatory disease, produced by local causes. Jayle, recognizing in many cases the atrophic nature of the process, finds nothing in the local histological changes sufficient to explain the special phenomena exhibited. Thibierge believes that the process is a local manifestation of a senile atrophic involution of the general integumentary system. The histology shows early hyperemia and exudation, with round-cell infiltration, and later atrophy of all the structures, including the appendages of the skin, followed by sclerosis.

Diagnosis.—The peculiar symptom complex above described, occurring in a woman after the menopause, is readily recognized. An ordinary leucoplakia is not accompanied by the intense atrophy seen in this disorder.

Treatment.—The treatment is largely surgical. Medicinal treatment is indicated in the leucoplastic cases, in which cauterization has been practised with good results. Heitzman reported the entire relief of three patients by the local use of salicylic and pyrogallic acids, combined with curettage with a sharp spoon. The removal by surgical measures of the sclerosed mass, wholly or in part, followed by plastic operations, has been successfully practised.

Prognosis.—The prognosis is unfavorable for most cases. The course of the disorder is toward persistence and slow extension. The possibility of malignant degeneration is always to be remembered.

AINHUM.

Synonyms.—Dactylolysis Spontanea, Banko-kereude, Sukha Pokla, Quijila. Ger., Absägen.

Ainhum (from a Nagos term meaning "to saw") is an affection of the colored races chiefly, especially of the negroes of the West African coast, as also of the natives of the Soudan, of Algiers, Egypt, the Transvaal, and, next in frequency to Africa, of the inhabitants of Brazil, though it has been reported in Buenos Ayres, the Antilles, and British Guiana. The disease was first described and named by Dr. Da Silva Lima.¹ It is possible that Clarke² may have observed the same or a similar condition, described by him as a dry gangrene of the little toe.

American cases³ have been reported by Herrick, Shepherd, Matas, Hornaday and Pittman, Wheatland, and Brayton. Though most of the patients have been negroes, the disease has been recognized in a few cases in white subjects.

Symptoms.—Ainhum affects the smaller digits, chiefly the little toe, but also other toes and fingers, sometimes one or more of the digits of the same foot or of both feet being involved simultaneously or successively. The onset is by the development of a furrow or shallow groove on the plantar face of the toe or palmar aspect of the finger near the digito-plantar or digito-palmar web. This furrow gradually deepens and spreads in a circumlinear direction until the digit is girdled by a

¹ *Gazeta Med. de Bahia*, 1867, Nos. 13 and 15.

² *Trans. Epidem. Soc. of London*, p. 105.

³ Cf. Da Silva Lima, *Arch. of Derm.*, October, 1880, p. 367, and several other communications by the same author; Shepherd, *Amer. Jour. Med. Sci.*, January, 1887 (with cut); *Ref. Handbook of Med. Sci.*, Art. Ainhum, with four cuts; Hornaday and Pittman, *No. Car. Med. Jour.*, September, 1881; Brayton, *Jour. Amer. Med. Assoc.*, July 8, 1905 (with cut); Wellman, *ibid.*, March 3, 1906, p. 636 (with analysis of etiologic theories); Wheatland, *ibid.*, August 26, 1905, p. 631 (with cut); Moreira, *Monatshefte*, xxx, No. 8, p. 361, abstr. *Brit. Jour. Derm.*, 1900, xii, p. 334 (a histological contribution); and Herrick, *Phila. Med. Jour.*, 1898, i, p. 246.

constricting and indurated ring in the form of a superficial, depressed gutter. The segmented portion of the digit becomes swollen, in consequence of the constriction, to twice or several times its normal size; and in time, usually in the course of two to ten years, the segmented part, at first resembling a small potato attached to a slender pedicle, drops from its original attachments. In this way, a species of spontaneous, bloodless amputation is effected. The nail of the member that is about to be detached by this process usually turns outward, the digit being commonly laterally everted. The changes in the segmented part, both in the nail and the tissues of the phalanges, are those naturally arising from strangulation of the member. The disarticulation may be effected at the first, second, or third joint; or even in the continuity of the phalanx. There is little pain, save such as is produced mechanically by the use of the foot or hand from which the digit depends. Occasionally, ill-conditioned and foul-smelling ulcers develop. In rare cases ulceration persists in the site of the wound left after separation of the digit.

In some instances trophic, vasomotor, and sensory changes, particularly of the limb where *ainhum* is progressing, are striking features of the case. The skin of the part may be pigmented, scaling, wrinkled, puckered, with wasted muscles, or covered with an unusual pilary growth, the tendon-reflexes obliterated, and sensibility decreased. Thickening and shortening of the foot, flattening of the plantar arch, and palmar and plantar keratoses may be conspicuous.

The disorder rarely attacks the white race. Dr. Hyde saw three cases of this type (one in France), where there was a coincident palmar and plantar keratosis, which he believed was of the same character as that recognized in the dense sclerotic ring which was working the amputation of the digit. Stelwagon¹ describes and pictures a case occurring in a patient the subject of *pityriasis rubra pilaris*. A typical case in a negress, involving the little toes of both feet, was recently seen by the author.

Etiology.—The disease occurs most often in male subjects of the African race, and in adults; but is recognized also in children, and quite rarely in the white race. Wellman reviews the several arguments urged in explanation of the disorder, and disposes of the theories that *ainhum* is a leprous lesion; that it is a trophoneurosis; that it is the result of self-mutilation; and that it is a circumscribed scleroderma. He believes with Manson that continued irritation produced by wounds of the foot in sharp grasses in the dark-skinned races, prone to the production of keloid, is responsible for the disorder. He also suggests that the chigger may be at times a factor in its production. In some instances the disease would seem to be hereditary, as there are reports of families every member of which has suffered. In other instances several members of two generations of a single family have developed *ainhum*.

¹ Diseases of the Skin, 7th ed., 1914, p. 626.

Pathology.—The pathogenesis of the disorder is undetermined. Histologically, the constricting ring is seen to be composed invariably of fibrous tissue, surmounted by a thickened epidermis. The blood-vessels of the corium are thickened and enlarged, but their calibre is lessened by an endarteritis. Degenerative processes follow, both of a fibrous and fatty nature. The bones apparently suffer secondarily from the constriction.

Treatment.—In early cases the constricting band should be severed, while in advanced cases amputation is required. Prophylaxis is by protection of the feet.

Prognosis.—The disease progresses slowly; relapses are rare. The process in general ends with removal of the constricted member.

CLASS V.

PIGMENT ANOMALIES.

LENTIGO.

Synonyms.—Freckle, Ephelis. Fr., Ephélide, Lentille; Ger., Sommersprosse.

Definition.—Freckles are circumscribed collections of pigment, varying in size from pinhead- to split-pea or larger, having a yellowish, brownish or darker color, and occurring usually on exposed surfaces, such as the face, neck, forearms, and hands.

Symptoms.—This condition is due to excessive and irregular deposit of pigment in the skin, producing the pinhead- to bean-sized spots of circinate or of irregular outline, frequently grouped or even confluent, usually symmetrically distributed on those parts of the body ordinarily exposed to the light and heat of the sun, such as the face, the neck, and the backs of the hands, in persons of both sexes. In those individuals whose bodies are to a greater extent similarly exposed they occur upon the chest, the back, and over the extremities. In other persons they may be seen upon parts not thus exposed, such as about the genital region and the inner surfaces of the thighs; a fact which indicates that freckles are not always the result of the operation of the agencies noted above. Knowles¹ found multiple freckle-like spots of varying size over the trunk in a child twelve years of age, the duration of the disease being eight years. The microscopic findings were those seen in ephelis.

The lesions vary in color from light-yellow, salmon, or red to the deepest brown, and are most noticeable in those having red hair and delicate skin. Freckles occur rarely in infancy, but as a rule make their appearance about the sixth or eighth year of life. They are commonly observed in mulattoes, individuals of a race particularly disposed to anomalies of pigment-distribution. Once developed, the lesions may last throughout life without marked alteration; or may fade with each recurrence of the season of winter; or in milder cases may disappear. They usually share in the atrophic changes of old age, and, when persisting to that period, may then spontaneously disappear. They are entirely devoid of subjective sensations.

A special form of lentigo frequently affects the covered parts of the body in fibroma molluscum, in xeroderma pigmentosum, and in cases where freckles are found having a unilateral distribution, arranged

¹ Jour. Cut. Dis., 1912, xxx, p. 83.

in streaks like a linear nevus.¹ This variety, in most instances, is in all probability a very superficial nevus. In doubtful cases it may be distinguished by a microscopic examination.

Etiology.—Freckles are unquestionably produced and aggravated at times by the action of the light and heat of the sun, as common experience suggests; but it is evident that these forces must act upon a susceptible skin. Of one hundred sailors exposed in precisely similar situations on a long cruise, some of the number will be uniformly tanned and others deeply freckled. Attention has been called to the occasional occurrence of freckles on the protected parts of the skin. It is said that exposure to sea air and fog, without the direct action of the sun's rays, is sufficient to produce these lesions.

Pathology.—The only pathological change noted in ephelis by Cohn (confirmed by Unna) is a deep pigmentation entirely limited to the regions of the lower layers of the prickle-cells, with an iron-free, melanotic pigment both intra- and extra-cellular, and a few granules and pigment-cells in the superficial portion of the papillary body.

Treatment.—The treatment of freckles is that of chloasma and other pigmentations of the surface. Wertheim, of Vienna, advises:

R—Hydrarg. ammon.,	gr. lvj;	3	75
Bismuth. magister.,	gr. liij;	3	50
Ungt. glycerini,	ʒj;	30	M.

Sig.—To be applied every other night.

Bulkley employs:

R—Hydrarg. chlor. corros.,	gr. vj;	4
Acid. acetic, dilut.,	fʒij;	8
Sodii boratis,	ʒij;	2
Aq. ros.,	fʒiv;	120
		M.

Sig.—To be applied night and morning, at first with gentle brushing; afterward by rubbing.

Hardaway touches each freckle with a rather stiff needle connected with the negative pole of a galvanic battery, and he finds the results satisfactory.

Unna recommends peroxid of hydrogen and oxychlorid of zinc in an ointment.

The several lotions and ointments outlined in the treatment of chloasma may be employed here. Most of the methods employed by charlatans for the removal of freckles depend for their success upon thorough blistering of the surface. Inasmuch as by this process the epidermis is removed, the pigment is also measurably removed with it, and the new epidermis is for a time free from blemish. But in all such cases the ultimate result is a deeper and more persistent pigmentation than that which was previously visible.

¹ MacLeod, Brit. Jour. Derm., 1913, xxv, p. 191: Pigmented Nevi-like Freckles. Case demonstration, Royal Soc. of Med.

CHLOASMA.

It is usual to describe under this title various pigmentary changes which occur both in localized patches or in more extensive areas, even to a diffuse discoloration of the entire cutaneous surface. The disorder may be idiopathic or symptomatic. When these areas are well defined and occur about the face, or even in other parts, they are popularly called "liver spots;" or, when the pigment is of a very dark or blackish shade, it is frequently known as *Melanoderma*. The color in all chloasmata varies from a scarcely perceptible staining of the skin, which requires a strong light for its detection, to a deep yellow, a yellowish-green, a chocolate-brown, or a blackish shade.

Chloasma Idiopathicum.—This variety of pigmentation is produced by agencies operating externally, in consequence of which an undue afflux of blood is persistently determined to any portion of the skin. Among these externally operating agencies may be named pressure and friction (as over the part covered by the pad of a truss); traumatism (as after the severe scratching of the skin affected with lice, eczema, or scabies); heat (as in diffuse tanning of the face or sunburn following exposure to the solar rays). Other agencies operating externally, frequently classed as toxic in their action, are applications of mustard, capsicum, cantharides, and other articles capable of producing either vesication or pustulation of the skin-surface. Persistent or even permanent pigmentation of the skin upon the face, shoulders, and breast, especially of young women, may be produced by the repeated applications of such topical medicaments.

Chloasma Symptomaticum.—The symptomatic varieties of pigmentation are the result of disorders either systemic or those involving internal organs. They occur as either circumscribed or diffused, localized or generalized spots, mottlings, stainings, or masks of the skin, and they vary in color from the lightest to the darkest shades. One of the most common, and at the same time the most important, of these varieties is

Chloasma Uterinum.—Chloasma uterinum is so called because of its frequent association with certain physiological or pathological conditions of the uterus, both among married and single women. Thus, in pregnancy, sterility, hysteria, chlorosis, ovarian disorders and tumors, and functional derangements of the uterus, there can be observed at times a facial discoloration extending equably over the forehead and reaching nearly to the line of the hairs at the scalp, in the form of a faint or a decidedly reddish-yellow or deep-brownish tinge. At other times the discoloration is macular and asymmetrical, involving the eyelids, the cheeks, the lips, or the chin. When the chloasma assumes the mask-like form, it is usually most pronounced over the forehead, but it may involve the whole facial region, being less distinctly defined below than above. Similarly, the well-known changes occur in the areola of the nipple, in the linea alba, and about the external genitalia. Extensive cases of pigmentation during preg-

nancy, which cleared up on the termination of this physiological state, are recorded by a number of observers. The pigmentation is unaccompanied by subjective sensations.

Other conditions producing symptomatic chloasma are tuberculosis, syphilis, cancer, chronic alcoholism, malaria, Addison's disease, Graves' disease, and other disorders. Among the cutaneous diseases capable of producing skin-pigmentation may be named scleroderma, lepra, lichen planus, psoriasis, eczema (especially *e. venis varicosis*), and pediculosis.

In **Addison's Disease** the pigmentation may be general or partial, and in the latter case is without definite lines of demarcation. It is most commonly pronounced over the face and neck, the scrotum, the groins, the axillæ, the nipple and areola. The hairs become coarse and dark; and dark- or grayish-brown patches are at times visible over the mucous surface of the lips, the gums, and other parts of the mouth. The bronze or mulatto-like color of the skin is intensified by stimulation or erosion of the cutaneous surface and by exposure to light. In these cases there are generally marked asthenia and a feeble pulse, with anorexia and other signs of gastro-intestinal disorder. When the result is fatal, there may or may not be recognized pathological alterations of the suprarenal capsules. When examined chemically, the pigment is seen to be iron-free.

In **Graves' Disease**¹ the pigmentation may occur as freckle-like patches or diffuse, usually most marked in regions which have normally more pigment than the general surface of the body.

Hemochromatosis indicates a pigmentation of the skin and viscera associated with hypertrophic cirrhosis of the liver and extensive sclerotic changes in the pancreas. It may terminate in glycosuria, and in the terminal stage it is called *Bronze Diabetes*.

The long-continued administration of arsenic for the relief of nervous disorders in adults and children is frequently followed by a characteristic dull-brownish or dirty-colored discoloration of the skin of the neck and chest. In some instances the pigment may become generalized, with a tendency to persist. The pigmentations from this cause resemble somewhat closely that found in Addison's disease, but here the mucous membranes are free. In addition there may be, in connection with the arsenical pigmentations, palmar or plantar keratoses and hyperidrosis, as well as keratoses elsewhere on the body (*Cf.* chapter on *Dermatitis Medicamentosa*).

Mongolian Pigment Spots.²—This is a congenital condition characterized by the presence of dark-bluish spots on the lower sacral region, found more commonly in the darker races. The lesions appear as

¹ For a review of the cutaneous changes seen in Graves' disease, with bibliography, see Dore, *Brit. Jour. Derm.*, 1900, xii, p. 353; Hyde and McEwen, *Amer. Jour. Med. Sci.*, 1903, p. 1000; Hyde, *Brit. Jour. Derm.*, 1908, xx, p. 33.

² *American Anthropologist*, March, 1907. Ashmead, A. S., *Jour. Cut. Dis.*, 1905, xxiii, pp. 203 to 214: The mulberry-colored spots on the skin of the lower spine of Japanese and other dark races a sign of negro descent. Castellani and Chalmers, *Tropical Medicine*, 1913, 2d ed., p. 1615.

blackish, bluish, or mulberry-colored, smooth, non-elevated areas. The skin is normal in texture, and the lesions are unaccompanied by subjective symptoms. In shape they are roundish, oblong or squarish, and may be single or multiple (five or six or more). In size they vary from one-half a centimeter to 12 centimeters or more. They may be well defined, or gradually fade into the surrounding skin. Their common site is the lower spine or sacral region, and buttocks, but they may occur all over the body. They are present at birth, and disappear about the third or fourth year of life.

Etiology and Pathology.—The chloasmata are all due to excessive deposit of the natural pigment of the body in the rete mucosum of the epidermis. The causes vary, as outlined above, in the different varieties. The histology is that of lentigo, except that the pigment deposited, instead of being localized, is diffused, but found in similar location in the lowermost layers of the rete.

From the above discolorations, which are due solely to the deposition in excess of coloring matter normally existing in the skin, it is necessary to distinguish the various dyschromiæ which are due to the introduction into the integument of coloring substances, either supplied by other portions of the body or foreign to it. Thus, in icterus the bile may color the skin from a light-yellow to a dark-chrome shade, the duration and severity of the cutaneous symptoms depending upon the nature and gravity of the hepatic disease. This condition is frequently accompanied by itching in various grades of severity, the exact causes of which are obscure.

Diagnosis.—The diagnosis of the various chloasmata is readily effected by observing: the persistence of the discoloration under pressure; the absence of all symptoms of hyperemia, inflammation, and secondary changes in the skin; and the characteristic shades of color presented to the eye. In tinea versicolor there is a slight furfuraceous desquamation, and the lesions occupy by choice the regions under the clothing. In addition, on microscopic examination, the *Microsporon furfur* may be readily demonstrated. In determining to which particular category the chloasma belongs, a reference must be made to the various symptoms above described.

Treatment.—In all the symptomatic pigment-anomalies the indications for treatment are presented by the disease which begets the cutaneous disorder.

The local treatment of both the idiopathic and symptomatic varieties of the affection demands the use of external applications which will hasten the physiological reproduction of the epidermis, substituting thus new and unpigmented for old and pigmented epithelia. This process must also be accomplished without the artificial production of such a hyperemia as will tend to add to the very coloration which it is attempted to relieve. The substances used for the slow accomplishment of this end are borax, sulphur, tincture of iodine, potassium and sodium hydroxids (including the soaps of these alkalies), and the mercurials. None of these substances is more gener-

ally employed than corrosive sublimate, which constitutes the basis of most of the cosmetic lotions sold in the shops.

The following formulæ are given by White for use in the evening. The preparations in each case should be left upon the affected surface during the night, and be removed by a soap-and-water washing in the morning. They are to be used for weeks in succession, but only after a cautious preliminary testing of the sensitiveness of the skin to their action. To avoid the possibility of error, the practitioner would do well to order a poison-label upon all vials containing the sublimate:

R—Hydrarg. am.,				
Bismuth magister.,	āā	3ij;	āā	8
Amyl.,				
Glycerin.,	āā	3ss;	āā	15
				M.
R—Ammon. chlor.,		3ss;		2
Aq. Colognien.,		f3j;		30
Aq. dest.,		Oss;		240
				M.
R—Hydrarg. chlor. corros.,		gr. vj;		4
Acid. hydrochlor., dil.,		f3j;		4
Glycerin.,		f3j;		30
Alcoholis,				
Aq. ros.,	āā	f3ij;	āā	60
Aq. dest.,		f3iv;		120
				M.

The following formulæ for ointments are given by Kaposi:

R—Hydrarg. ammon.,				
Sodii biboratis,	āā	3ss;	āā	15
Ol. rosmarin.,		gtt. x;		66
Ungent. simpl.,		3j;		30
				M.
R—Acid. boric.,				
Cer. albæ.,	āā	3j;	āā	4
Paraffin.,		3ij;		8
Ol. amygd. dulc.,		3j;		30
				M.

Van Harlingen recommends:

R—Hydrarg. chlor. corros.,		gr. vss;		4
Zinci sulphatis,				
Plumbi subacetat.,	āā	3ss;	āā	2
Aq. dest.,		f3iv;		120
				M.

Sig.—Lotion for external use, morning and evening.

Other applications advised are: alcohol, followed by the use for several hours after of a plaster of ammoniated mercury; 2 parts of magnesium carbonate and zinc oxid, 4 parts of pure kaolin and glycerin, and 10 parts of vaselin; chloroform 100 parts, chrysarobin 15 parts (Leloir); hydrogen peroxid; diluted acetic, hydrochloric and nitric acids and phenol; 1 to 2 parts of salicylic acid, in paste or powder, to 20 parts of base; and solutions of mercuric chlorid in collodion, 1 part to 30, employed with great caution.

The rapid removal of pigmented patches is accomplished, in Vienna, by covering the part with strips of linen dipped in an aqueous or an

alcoholic solution of mercuric chlorid of the strength of 4 grains (0.25) to the ounce (30.), with which solution the dressing is also occasionally moistened. Vesiculation is usually accomplished in about four hours, when the serum is evacuated by puncture, and the detached epidermis is covered with an inert dusting-powder. The resulting crusts fall in about eight days. The procedure is attended with danger of producing in the end the precise deformity which it seeks to remedy, a danger explained above.

Prognosis.—The prognosis is in all cases uncertain. There is strong reason to believe that the local treatment of these dyschromiæ is, in the long run, ineffective. Those methods which effectively and brilliantly accomplish the desired end temporarily are almost invariably followed by deeper pigmentation than that which it was attempted to remove; those operating more slowly have, probably, a less speedy but scarcely more disguised sequel. The treatment intelligently directed to the cause of each discoloration is that which in the end proves most satisfactory.

Argyria.—A bluish, bluish-gray, slate-colored, or bronzed coloration of the skin may result from ingestion of silver nitrate. Argyria is most commonly the result of the administration of the drug in the treatment of epilepsy, but it is said to have also resulted from the topical application of silver crayons to the throat, to the conjunctivæ, and even to the skin. Under what form the silver produces this effect, whether as an albuminate or other salt, is not known. The deposition, however, occurs in the form of minute particles of the metal in the connective tissue of the derma. The discolorations are most evident upon the parts of the skin exposed to the light, as the face and hands; but the chest and the lower extremities may be stained similarly. The connective tissue of the viscera is at times also involved, showing thus that the action of light is not essential to the production of the dyschromia. Two cases are reported as relieved by the administration of potassium iodid.

Tattooing.—By the process of tattooing, mineral and vegetable substances are directly introduced into the corium by means of needles, for the production in the skin of various devices in colors. Individuals whose entire integument has been thus artificially covered with figures of different patterns by tattooing with indigo, vermilion, and cinnabar are from time to time publicly exhibited. The results are indelible. Post-mortem these pigments have been discovered not only in the derma, but also in the lymphatic ganglia nearest the site of their introduction.

The condition produced by *powder-stains* is practically identical with tattooing. Here particles of powder and other extraneous material are deposited in the skin.

Treatment.—A method of removing tattoo-marks and pigmented nevi successfully employed by French dermatologists consists in tattooing the region, previously rendered aseptic, with a solution of 30 parts of zinc chlorid to 40 parts of water. If properly done, the

resulting inflammation is slight, and after a few days there forms a superficial crust, which remains about a week and then falls, leaving a slight scar, which becomes almost imperceptible. This method succeeds in a few cases, but requires skill and care in its application in order to obtain good results and to avoid suppuration and deep cicatrization.

Blue Pigmentation.—Gottheil¹ reported a case of blue pigmentation, associated with atrophy of the skin, following hypodermic injections of cocain. Other cases are recorded of bluish pigmentation following injections of morphin and of cocain, and are attributed either to extraneous pigment, such as carbon or impurities contained in the drug itself, or to particles of metal from the needles used by patients.

Treatment.—The treatment of all these conditions is most unsatisfactory. Various methods have been employed with varying success.

LEUCODERMA.

Synonyms.—Achromia, Leucasmus, Partial Albinism.

In the following pages the name leucoderma is employed to designate the pigment-atrophy which is partial and congenital; albinismus, that which is universal and congenital; vitiligo, that which is acquired.

In leucoderma (the patients being most often, though not exclusively, of the colored races) one or several whitish or rosy-whitish patches or bands, varying in size, outline, or situation, and unprovided with pigment, may be seen at birth. These patches may have a symmetrical arrangement, in which case they commonly observe the areas of distribution of one or more cerebral or spinal nerves; or they are asymmetrical in distribution. They are usually of circular outline, and may be found upon the scalp, face, nipple, breast, and genital and other regions. The hairs found upon such parts are equally destitute of normal color, being usually white. Negroes thus marked are generally termed "piebald," and the integument similarly affected in persons of other races has long been recognized as the "pied" or "piebald" skin. These blemishes when symmetrical, like pigmentary nevi, exhibit a striking analogy to the symmetrical arrangement of the spots, bands, and stripes to be recognized in the furs of many of the lower animals. The outline of the patch may be abrupt, or it may gradually shade into that of the adjacent integument. At times islands of pigmented skin are visible within the non-pigmented areas. The changes in these patches during later life may be insignificant, or they may individually increase in size with age, or even multiply. Rarely they regain pigment in later life. In no case is there an excess of pigment deposited at the border of the patch.

This condition is practically remediless.

Albinismus.—**Synonyms:** Complete Congenital Leucoderma, Congenital Leucasmus, Congenital Achromia, Congenital Leukopathia.

The term albinismus is here limited to the congenital conditions of achromia induced by universal absence of cutaneous pigment.

¹ Jour. Cut. Dis., 1912, xxx, p. 1 (with references to allied cases).

Symptoms.—This deformity is peculiar to individuals known as “albinos” (Kakerlaken; Dondos). Isolated instances of this anomaly occur in all races, but more frequently among those having normally a hyperpigmentation of the skin, such as negroes. In the subjects of this anomaly the skin has a milky-whitish, transparent, or rosy-tinted hue, and is usually of delicate texture; the hairs are silky and yellowish, reddish, whitish or snowy-white in color; the iris transparent or pinkish; and the pupil, in consequence of defect of pigment in the choroid, is also reddish or pinkish. There are, as a result, nyctalopia and heliophobia, with frequent nictitation, pupillary variations, and the semblance of myopia. The pinkish hue of the skin in these individuals is due only to its translucency and vascularity. The defective condition of the pigment is usually unchanged throughout life; but in no other respect does the skin of the healthy albino indicate disease.

Many persons thus deformed, however, are far from vigorous. It has been observed that some albinos are physically inferior to the average of persons of the same sex in stature, weight, mental activities, and powers of resistance to disease. There are, however, numerous striking illustrations of the reverse of this, and we have had under observation a number of albinos in one family in which alternations of non-pigmented with normally pigmented children exhibited no difference whatever in sturdiness and vigor. Many enfeebled albinos are simply illustrations of the wretchedly unwholesome life of persons imported into foreign countries for exhibition.

Etiology.—Inheritance is evidently a strong factor in the production of this and similar pigment-anomalies. Alternations in birth of white and of black children in one family are recorded, yet it is unusual to find albinos in two succeeding generations, an occurrence of no great rarity in inherited affections.

The condition is remediless. It has been suggested that transfusion with the blood of a vigorous black-skinned African might modify the color-characteristics of the pure albino.

In Marcy's¹ report, a black father and mother had first two black male infants, then two female albinos, then a black female child, and, lastly, a male albino. In Sym's² cases, the first, third, fifth, and seventh children were albinos.

Vitiligo.—**Synonyms:** Acquired Leucoderma, Leukopathia, Leukasmus, Achromia, Piebald Skin.

Definition.—Vitiligo is an acquired cutaneous achromia, exhibited in single or multiple, variously shaped and sized patches, unaccompanied by textural changes in the skin, and usually bordered by tissues exhibiting pigmentary excess.

Symptoms.—This disorder of the pigment of the skin is one observed among the several races, often in the negro, and not rarely among those of Aryan descent. It commonly occurs without the slightest

¹ Amer. Jour. Med. Sci., 1839, xxiv, p. 517.

² Trans. London Ophthal. Soc., 1891, xi, p. 218.

appreciable disorder, subjective or objective, save that betrayed to the eye in the color-changes of the skin. One or several rounded, oval, or very irregularly shaped, smooth, and well-defined, pale or milky-white lines, streaks or disks appear, often bordered at the periphery by an integument which has assumed a light- or dark-brown or chocolate shade, this hue being by contrast most noticeable immediately at the contour of the patch, and imperceptibly fading into the normal color of the outlying integument. These patches are neither elevated above

FIG. 123

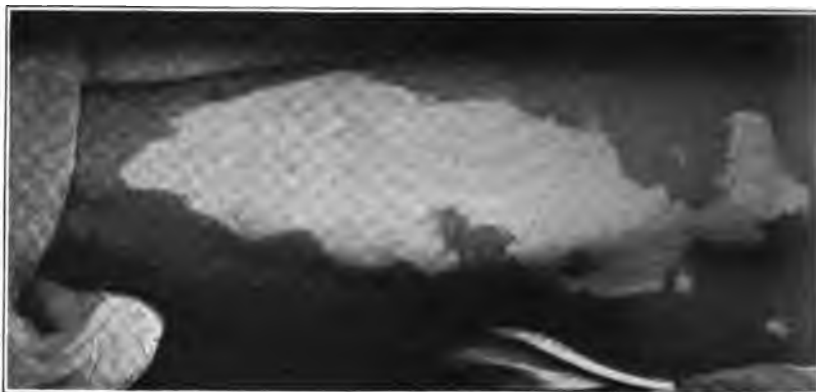


Vitiligo. (G. H. Fox's Atlas of Skin Diseases.)

nor depressed below the general level of the integument. The patches may be few, numerous, or in rare instances coalesce to the point of producing a generalized albinism. The hairs or lanugo-filaments growing from the affected area may or may not be blanched; most commonly they are, a condition particularly conspicuous when, as is not rarely observed, a vitiliginous disk extends from the back or the side of the neck well into the scalp, in which case the outline of that portion of the scalp involved is clearly defined by the whitened pilary growth. Lesser describes a condition, termed by him *Peliosis Cir-*

cumscripta Acquisita, in which the hairs are thus blanched in a single area of an unaffected scalp, an observation confirmed in many cases.

FIG. 124



Vitiligo.

FIG. 125



Vitiligo.

The most common seats of the disease are the face, the neck, the backs of the hands, the genitals, the trunk, and the extremities. Upon the backs of the hands the disfigurement is usually more conspicuous in summer than in winter, a circumstance which probably explains the reported instances of recurrence and total disappearance of the disease

in successive years. The changes are due to a deepening of the pigment in the normal areas on exposure to the sun, thus making a more striking contrast with the non-pigmented spots.

The course of the affection is exceedingly slow; there may be for years no apparent extension of any involved area, or the achromia may progress by peripheral extension and by the coalescence of relatively small affected areas until a large portion of the trunk, the thighs, the buttocks, or other part of the body is involved. Hall¹ reports the case of a dark mulatto who became "perfectly white," with the exception of a patch on the chin. Lévi² reports three instances of total disappearance of pigment. Hardaway,³ Simon,⁴ and Stelwagon⁵

FIG. 126



Vitiligo. (Douglass W. Montgomery.)

also report cases in which the loss of pigment was general or complete. It not infrequently happens that the loss of pigment is so extensive on the face, hands, and other regions that the eye of the observer is struck no longer by the unusual whiteness of the involved patches, but this whiteness being generalized and apparently that proper to the person, the remaining normal areas appear to be hyperpigmented. Patients with vitiligo frequently suppose that the whitened areas are normal, and the darker ones abnormally pigmented. Persons of

¹ Louisville Med. News, 1888, x, p. 148.

² Recueil de Mém. de Méd., de Chir. et de Pharm. mil., 1865, p. 193.

³ Manual of Skin Diseases, 2d ed., p. 280.

⁴ Deutsch-klinik, 1881, p. 399.

⁵ Amer. Jour. Med. Sci., 1885, xc, p. 168.

lymphatic temperament and blond complexion (often women in early adult life) occasionally will apply to a physician for relief of dark patches on the skin of the face. Examination discloses faint lines, ribbons, or streaks of pigment about one or both cheeks, the temples, or the lips. But careful scrutiny recognizes an undue whiteness of the skin, with exceedingly faint and irregular outline near or next to those pigmented portions of which complaint is made. In these cases care is necessary to make a diagnosis between vitiligo and chloasma.¹

The disorder shows a tendency to spread, though as a rule a limit is reached eventually beyond which the atrophy does not progress. In exceptional cases the parts which have lost pigment again acquire it.

The patch of skin from which the pigment has been removed is often exceedingly sensitive to the action of solar rays and to externally applied irritants, chemical and other. It then exhibits a peculiar, diffused pinkish color, occasionally with production of reddish papules, the disappearance of which never is followed by the pigmentation occurring in normal skin after marked hyperemia.

In vitiligo, aside from the dyschromia, the skin is normal. Patients affected with vitiligo should be subjected to a careful general examination, as there is usually a deviation from the normal in some organ of the body. In children it may occur as early as the fourth year of life (Crocker), and although not generally recognized in such cases it usually follows scarlet fever. It is especially apt to develop on lichen planus, scleroderma, syphilis, and leprosy.

In women it is most frequently observed as a manifestation of the menopause. It also occurs in nervous exhaustion, myxedema, asthma, and in Graves' disease,² even when the symptoms are not well marked; also in association with some minor affections. A morbid mental condition, especially in women of middle life, often is produced when the disfigurement involves the facial region.

Etiology.—Although the etiology of the disease is unknown, it may best be explained, as stated by Gaucher,³ on the assumption that it is caused by toxins derived from some distant hidden or apparent focus of disease. The disorder is of more frequent occurrence than dermatological statistics tend to show. Many persons who are the subject of vitiligo of an inconspicuous part of the body do not consult a physician with regard to the nature of the disease, as it occasions no physical distress. Vitiligo in the colored races may follow strong irritant local applications, such as formalin.⁴

Pathology.—The pigment normally present in the deep rete-cells is absent in vitiligo-spots, but greatly increased and deepened at the borders of the areas. In the corium are cells which contain pigment, granules. These are especially numerous at the margins of patches

¹ Jackson, *Jour. Cut. Dis.*, 1911, xxix, p. 555.

² Dore, *Brit. Jour. Derm.*, 1900, xii, p. 353; Hyde and McEwen, *Amer. Jour. Med. Sci.* 1903, cxxv, p. 1000.

³ *Annales*, 1902, s. iv, iii, p. 1113.

⁴ Castellani and Chalmers' *Manual of Tropical Med.*, 1913, 2d ed., p. 1609.

where blood-vessels, follicles, and glands are surrounded by many oval, stellate, and branched pigment-cells. Leloir and Chabins have demonstrated atrophy of the subdermal nerves in patches devoid of pigment. Other changes in the skin have not been noted.

Diagnosis.—The diagnosis is based on the achromia, with usually a hyperpigmented border, and the absence of other symptoms. In all typical cases the recognition of the disease is facile. The several chloasmata are distinguished by their failure to exhibit the distinctly outlined circular border of the characteristically developed vitiligo patch. Much attention has been given to the distinction between vitiligo and the leucodermatous patches of anesthetic lepra, but a study of the macular lesions in the disease last named reveals distinctly the presence of a systemic disorder with anesthesia of the affected areas. Morphea is a disorder of the skin accompanied by infiltration of the integument, while vitiliginous patches are solely distinguishable by reason of the color-changes. The color, surface-scaling, and localization of tinea versicolor usually serve for its recognition, and the parasite always can be recognized by the microscope.

Treatment.—Much chagrin will be saved both physician and patient by practically regarding vitiligo as not amenable to treatment. Patients occasionally recover while under treatment, which, however, has contributed generally but little to the result. Arsenic and iron internally, recommended highly by some writers, have failed repeatedly to accomplish any appreciable results as regards dyschromia. By efforts directed to the removal of the hyperpigmentation in the border of the achromic patches, the disfigurement may be lessened somewhat. The method of arriving at this end is described in connection with the treatment of chloasma. It is possible that further experimentation with hypodermatic injections of pilocarpin, that have in a limited number of cases been followed by disappearance of the disease, may warrant a less unfavorable view of the results of treatment. Savill¹ reported a return of normal color in vitiliginous patches to which he had applied pure phenol. D. W. Montgomery² reports a case of vitiligo in which several applications of the Finsen light were followed by restoration of the normal pigment. We have tried the method in four cases with negative results. Stein³ produced pigment in vitiliginous areas by means of the Kromayer quartz lamp and by freezing with carbon-dioxid snow. Ochs⁴ applied tincture of nux vomica on areas of vitiligo as a placebo, with return of the pigment in the areas treated. Heidingsfeld⁵ recommends a special instrument for tattooing pigment into vitiliginous areas.

Prognosis.—The health of the subject of the malady is not impaired. The disease is practically incurable, progressing usually until it has obtained a maximum of development; and then, as a rule, remaining unchanged throughout life.

¹ Brit. Jour. Derm., 1898, x, p. 99.

² Jour. Cut. Dis., 1904, xxii, p. 17.

³ Archiv, xcvii, p. 163; abstr. Brit. Jour. Derm., 1910, xxii, p. 102.

⁴ Jour. Cut. Dis., 1911, xxix, p. 111.

⁵ Derm. Centralb., November, 1908, p. 34; abstr. Brit. Jour. Derm., 1909, xxi, p. 126.

CLASS VI.
NEW-GROWTHS.

CICATRIX.

Synonyms.—Scar. Fr., Cicatrice; Ger., Narbe.

Definition.—A cicatrix is a connective-tissue new-formation of the skin, replacing normal structures which have been lost by traumatism, by ulceration, or by some other pathological process. Most cicatrices are reparative in character, as, for example, those following the ulcerations of syphilis, the operations of the surgeon, or the dermatitis produced by a severe burn.

Symptoms.—Scars vary greatly in shape, size, color, and other features. They may be smooth, glossy, shining, scaling, dull-whitish in color, or pinkish from vascularization of the surface. They may be linear, fan-shaped, circular, corded, ridged, dotted, crateriform, or tumor-like. They may be raised above the skin, be on a level with it, or be depressed below it. They may be deeply attached to periosteum or to bone, or be readily movable over the panniculus adiposus. They are of deeper color when young, and increase in whiteness with age, and are unprovided, as a rule, with hairs, or with coil- or sebaceous glands.

The most insignificant cicatrices are those resulting from clean, incised, and punctured wounds and lesions of similar grade. Certain peculiarities of cicatrices are seen in the special disorders in which they are produced. Circular, oval, reniform, horseshoe-shaped, S-shaped, and figure-of-eight-shaped scars, thin and flexible, are characteristic of syphilis. The cicatrices of variola, zona, and ecthyma are slightly different each from the other, though all are of small size and depressed. Those of tuberculosis and burns of severe grade are exceedingly irregular and often corded, and when occurring about the joints produce deformity through contraction.

Hypertrophy of cicatrices is the condition elsewhere described as keloid. Here there is a tumor-like development of the cicatrix, in the form of a ridge, button, knob, indurated fold, or puckered and irregularly circumscribed, whitish or reddish lesions. In certain individuals these lesions may follow almost every traumatism and destructive process to which the integument is liable.

Keloid-like cicatrix of the cheeks following acne is far from uncommon. Its lesion is usually smoothed down in the process of time, after the disappearance of the sebaceous-gland disorder, until the deformity is lessened greatly, and often scarcely noticeable. Colloid

degeneration occurring in scar-tissue and producing lesions which clinically resemble those of xanthoma is described by Juliusberg¹ and Dubendorfer.² We have seen this condition twice—once in the scars of syphilis and once in those of tuberculosis.

Etiology.—The formation of cicatrix is always preceded by destruction of at least a portion of the papillary body of the corium. This loss of tissue may be due to various causes: trauma, burns, ulcers, and atrophy caused by pressure of new-growths. Hypertrophied

FIG. 127



Scars following hypodermic injections of morphin. (Fordyce.)

cicatrix may result from slight but continued or frequently repeated irritation of a healing surface, the repair of which is thus greatly delayed, but it occurs chiefly in the form of cicatricial keloid.

Pathology.—Histologically, scars are made up of connective-tissue bundles, which interlace in all directions with great irregularity. In young scars the fibers are finer and the tissue is vascular, but as the

¹ Archiv, 1902, lxi, p. 175 (with bibliography of colloid degeneration, and of pseudo-xanthoma).

² Ibid., 1903, lxiv, p. 175.

scar grows older the fibers usually become coarser and contract and the vessels disappear. There is complete absence of the hair-follicles, glands, and furrows of normal skin. The scar-tissue proper is covered with a very thin epidermis, and Heitzmann claims that shallow and irregular papillæ are always present. Other observers report in scars an entire absence of both papillæ and rete-pegs.

Diagnosis.—The distinction between hypertrophied cicatrix and keloid is one chiefly of degree, and needless from a practical point of view.

Treatment.—The resources of modern surgery are to be trusted in the production of laudable cicatrices when all antiseptic precautions are observed. The treatment of pathological conditions likely to be followed by cicatrices is the treatment largely of the special disease in which such loss of tissue occurs; *e. g.*, the ulcer left by a degenerating syphilitic gumma of the skin. An irregular or disfiguring cicatrix may be excised if there be sufficient tissue to permit direct union on either side. Skin-grafting may be employed after excision of larger scars. Radiotherapy has given good results in some cases, producing, through absorption of the tissue, a softer, thinner, and smoother scar than the original. Injections of thiosinamin have been successful in a few instances. Further details are given under treatment of keloid.

KELOID.

Synonyms.—Cheloid, Kelis, Alibert's Keloid. Fr., Chéloïde, Cancroïde; Ger., Knollenkrebs.

Definition.—Keloid is a neoplasm of the derma, usually following trauma, developing as one or multiple fibro-cellular elevations of the skin, irregularly shaped, smooth or corrugated, whitish or reddish in hue, and resembling a thickened and hypertrophied cicatrix.

The term keloid, first given to the disease by Alibert, should be restricted to the above defined disorder. The keloid of Addison is now known to be scleroderma.

Authors have described two varieties of the disease: the "true," "spontaneous," or idiopathic form; and the "false," "spurious," or cicatricial form, which develops in the scar produced by a traumatism. There is no anatomico-pathological separation between the two. Cases of so-called spontaneous keloid are usually instances of development of the growth following such slight wounds as those inflicted by mosquitoes, by scratching, contusion, traction, or pressure.

Symptoms.—The new-formations of this disease are dense, generally elastic nodules imbedded in the corium, or projecting above the level of the skin and firmly attached to it. They are usually slow of evolution, and having once attained full development and assumed one of the several shapes which they affect often persist for a lifetime. These forms are whitish or reddish, globular or semiglobular nodules, buttons, or plaques, with roundish or ovoid outline; linear, elevated striae, bands, ridges resembling cords, ribbons, or tapes, in irregular

PLATE XVII



Keloid in the Negro.



FIG. 128



Keloid.

FIG. 129



Hypertrophic scars (keloid) following burn.

outline and disposition; or combinations of two or more of these figures. A common form over the sternum or other situations where the development of the growth in one direction is not impeded is that of a larger central mass with two or more diminishing and declining prolongations, bearing a remote resemblance to the body and claws of a crab. The lesions vary in size from that of a small pea to that of a large plate, the largest including the outlying points of the limbs or radiating ridges. The lesions may be white, grayish-white, light- to deep- or even vivid-red in color. In the colored race the lesions are either blackish or entirely devoid of pigment. Their surface is smooth, hairless, and frequently shows telangiectatic blood-vessels.

FIG. 130



Keloid following burn.

The subjective sensations aroused are commonly trifling or inappreciable. At times the growths are the seat of severe pain or burning, and occasionally are hypersensitive to pressure and heat.

The most frequent site of the disease is the anterior surface of the chest, but it is observed also upon the face, neck, ears, breast, hands, between the scapulæ, and on the extremities. Though frequently multiple, there are rarely more than a score of these growths visible at one time upon the skin of an individual. The disease is far more common in the colored than in the white races.

The usual course of the disease is toward the production of tumors of a medium size, after which few changes are to be recognized. Involution and complete disappearance are rare. These results, however, have been secured in a few cases.

Cicatricial Keloid (*Scar-keloid; Hypertrophic scar; Hypertrophic cicatrix*).—These terms are employed to indicate that the lesion has been preceded by scar-formation due either to disease or injury. It thus follows the lesions of zoster, syphilis, and variola, as also traumatism of all sorts, including those made by surgical operations and accidents. The presence of a large number of small, scattered keloids suggests to the mind of the experienced clinician the frequent use of the hypodermic syringe, as keloids may form at the point of puncture of the hypodermic needle.¹

It is not every scar, even in susceptible individuals, which becomes hypertrophic. The tumors, as a rule, spring directly from scar-tissue, and after reaching a maximum of development do not surpass the limits of the original lesions. At times, however, the growths slowly develop at a distance from the original site of the injury or disease. Those growths remaining limited to the site of the original injury are more properly considered as hypertrophic scars.

Scar-keloid often is found as a firm nodule in the lobe of each ear among women who have pierced the ears for the insertion of earrings. Lesions in this situation often assume huge proportions. It is seen also not rarely as a result of burns, whether produced by the application of caustic agents or heat. Lesions of this kind rarely develop symmetrically. They may be counted at times by the hundred; commonly but one or two are seen in one person. They may persist after reaching a maximum development, or spontaneously disappear, wholly or in part, or ulcerate, or become the seat of malignant growths.

Acne Keloid.—Acne keloid is a term descriptive of a disease occurring usually on the nucha and scalp, formerly supposed to be a keloid (*Cf. Dermatitis Papillaris Capillitii*).

Etiology.—The origin of the disease is obscure. Neither age, sex, nor previous disease of the skin seems to have any bearing upon its production. It is seen in vigorous persons (more often in the negro race), but also in those who are weakly. Schramek² records multiple keloids in association with Mongolian spots, thus suggesting their congenital origin. Heredity and family influences³ play a part in certain cases. The exciting cause of many keloidal growths is most frequently found in trauma, burns, and suppurative processes induced by many agencies, a common one being that occurring in connection with tuberculous adenitis of the neck. In many of the so-called idiopathic keloids, no preceding pathological condition is demonstrable. Krzysztalowicz⁴ considers keloid to be a chronic inflammatory process,

¹ Herzog, Jour. Amer. Med. Assoc., June 1, 1907, p. 1844.

² Archiv, 1910, xcix, p. 207; abstr. Jour. Cut. Dis., 1910, xxviii, p. 424.

³ Jour. Cut. Dis., 1905, xxiii, p. 365.

⁴ Monatshefte, 1909, xlix, p. 381; abstr. Brit. Jour. Derm., 1910, xxii, p. 145.

and that most spontaneous keloids are due to a chronic inflammation of the hair-follicles and sebaceous glands. He believes that the two forms are not separable.

Pathology.—The pathogenesis of the disorder is not understood. The histology shows a dense connective-tissue new-growth limited to the corium. In newer formations a larger number of connective-tissue cells are present; while later the mass becomes more dense and cell-less frequent. Extending from the growths are masses of cells, usually surrounding blood-vessels, and it is due to the presence of these masses of cells that recurrence happens after supposed extirpation of the mass. According to Warren,¹ the keloid begins by a growth of round cells in the adventitia of the arterioles of the corium. These cells become fusiform, and finally develop into the connective-tissue fibers forming the tumor. According to Langerhans,² Warren,³ Kaposi, and others, in all cases of keloid the papillary layer of the corium and the interpapillary projections of the rete downward are intact, the new-formations being strictly limited to the middle and lower portions of the corium, in which there are numerous dense collagenous bundles, disposed for the most part parallel with the surface of the skin. In cicatricial keloid, these observers found a partial or complete absence of the papillary and interpapillary processes. Babes, Crocker, and others, on the contrary, found that the papillæ and rete may be normal, modified, or absent in either form. Heidingsfeld⁴ found none of the peculiarities above described holding true in all cases, and believes there is no histological distinction between the different varieties. The elastic tissue is described as being attenuated, absent, or in the process of new formation. Heimann⁵ found evidences of regeneration of elastin. The sebaceous glands, coil-glands, hair-follicles, and muscles are pushed to one side by the new-growth and not infrequently become atrophied.

Diagnosis.—The situations of the lesions of keloid (often over the sternum), the peculiar claw-like elongations, and yellowish-white, reddish, or grayish-white color, all point to the nature of the disease.

Treatment.—The most satisfactory treatment for keloid and hypertrophic scars is found in radiotherapy. Ullmann, Taylor, Pusey, and others report instances in which a keloid or thick scar has been removed wholly or in part by the use of x-rays. In a large number of cases of all varieties we have found much improvement, and in most instances obtained complete removal of the elevated, indurated lesion and its replacement by soft, smooth, though sometimes telangiectatic scar-tissue. In several instances in which hyper-

¹ Annales, 1888, ix, p. 573.

² Virchow's Archiv, Dritte Folge, Bd. xl, p. 334.

³ Loc. cit.

⁴ Jour. Amer. Med. Assoc., October 18, 1909, p. 1276: Keloid: A comparative histological study. (In this study seven cases of spontaneous keloid, three of false keloid, one of soft multiple fibroma, two cases of hypertrophic scars, two of atrophic scars, two of scleroderma, and two of macular and striated atrophia cutis were examined.)

⁵ Archiv, 1910, cii, p. 65; abstr. Jour. Cut. Dis., 1911, xxix, p. 119.

⁶ The Röntgen Rays in Therapeutics, p. 558.

trophic scars due to burns from steam or fire were extensive and very disfiguring, the entire thickness of the growth was removed, leaving soft, pliable scars. Removal of keloid by cauterization and excision is not to be practised, as the growth commonly recurs. Vidal successfully employed multiple linear scarification. Lawrence¹ obtained good results by scarification, followed for several weeks by moderate pressure produced with rubber tubing held in place by adhesive plaster. Various stimulating applications may also be made with a view to promote resorption, such as the tincture of green soap, iodized glycerin, iodine in ointment and tincture, and mercurial, salicylated, and lead plasters. These applications are to be made with caution. Where there is pain, anodyne ointments may be employed topically, such as freshly prepared belladonna plaster, or ointments of belladonna, stramonium, and opium. One that has been especially valuable and which is also capable of producing an alterative effect is an ointment of the oleate of mercury and morphine. Ularic and others report successful destruction of keloid with injections of 5 to 20 per cent. solutions of creosote in olive oil. Electrolysis has given good results in a few cases. Tousey, Newton, Crocker, Neisser, and others report excellent results from injections along the growths of from 10 to 20 minims (0.66–1.33) of a 10 per cent. solution of thiosinamin in equal parts of glycerin and water, or in alcohol. Mears² employed thiosinamin successfully in one case, in dosage of $\frac{1}{2}$ to 1 grain internally, in connection with a 5 to 8 per cent. ointment of the same drug applied locally. Internally, quinine, strychnia, arsenic, and potassium iodide have been given with varying success.

Prognosis.—As regards the general condition of the patient, the prognosis is favorable. Very rarely there is spontaneous resorption of the nodule or tumor. Generally the latter may be expected to persist, after full evolution is attained, for an indefinite period of time.

FIBROMA.³

Synonyms.—Fibroma Molluscum, Molluscum Fibrosum, Molluscum Simplex Pendulum, Neurofibroma, von Recklinghausen's Disease.

Definition.—A fibroma is a connective-tissue new-growth of the skin, which may occur as a hard or soft tumor, varying in size, shape, and consistency. The lesions may be single or multiple, congenital or acquired, and, in the cases with multiple lesions, are frequently accompanied by pigmentation.

Symptoms.—Multiple fibromata usually begin to develop early in life, or at about the age of puberty, and gradually progress, new lesions

¹ Brit. Med. Jour. 1898, ii, p. 151.

² Med. Record, 1910, lxxviii, No. 2, p. 902.

³ Friedlander, Jour. Cut. Dis., 1910, xxviii, p. 497 (report of a case of multiple neurofibromata, with review of the subject, based on 262 cases reported in the literature). Ravogli, *ibid.*, 1911, xxix, p. 71: Fibroma molluscum or universal neurofibromatosis (bibliography).

appearing from time to time, until in some cases large numbers are present.¹ They are irregularly disseminated over the cutaneous surface, being seen in highest development over the front and back of the trunk; in fewer numbers over the head, face, and limbs. The lesions are usually pea- to egg-sized tumors, and vary greatly according to their age and dimensions. In early development they present dome-shaped, pea- to bean-sized elevations, which are softish, semisolid or pasty, and with a normal epidermal covering. Later they are cone-shaped, frequently nipple-like, semisolid formations, sometimes capped by an

FIG. 131



Multiple fibromata.

opaque summit, which presents the appearance of a vesicle, and which bleeds freely when pricked. Wickham² emphasizes the occurrence of small, dome-shaped, elevated, soft, violaceous prominences and patches scattered throughout these lesions. Digital compression causes some of these tumors to disappear through a ring in the skin, and when released they spring back into their normal position. Old tumors are less gelatinous, are firmer, harder, and not infrequently are mammilated and pedunculated. Small-sized tumors may recede, leaving an empty patch of skin. When diffuse, especially about the face, they draw the skin into extensive folds.

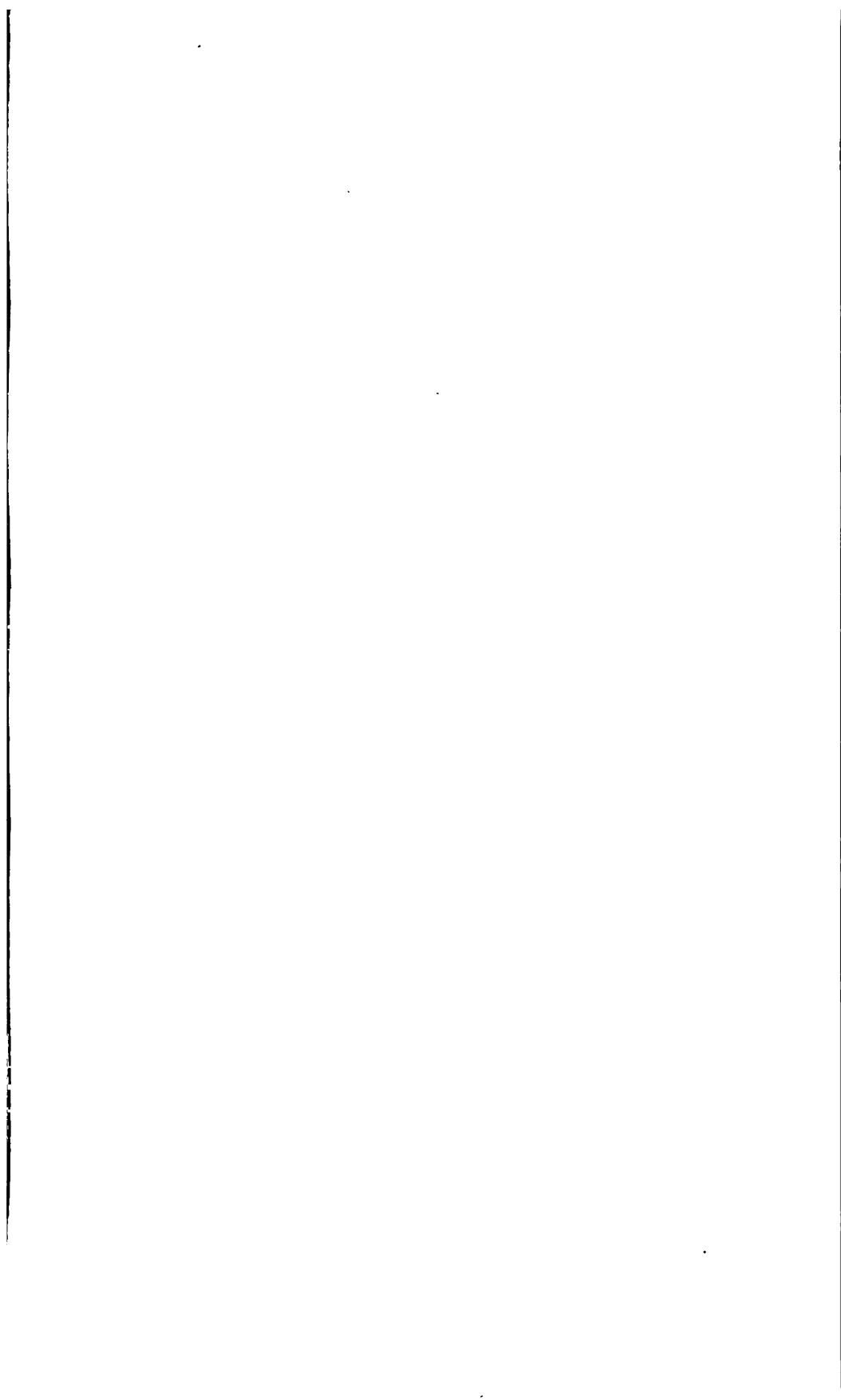
¹ Razumovski, Russki Joor. Koznikh E Venericheskikh Boleznei, February, 1913, xxv, No. 2, p. 103; abstr. Jour. Cut. Dis., 1913, xxxi, p. 1060 (a case with 5868 tumors scattered irregularly over the body).

² Brit. Jour. Derm., 1890, ii, p. 151.

PLATE XVIII



Multiple Fibromata of the Back.



Fibroma pendulum occurs most frequently about the face and sides of the neck, the occipital region, the arms, axillæ, breast, buttocks, thighs, and labia. Huge masses weighing several pounds are frequently developed, and the skin hangs in lax folds and not infrequently overlaps. The masses present to the palpating finger the sense merely of skin and fat. The skin, in addition to presenting a lax appearance, is frequently pigmented and covered with plugged sebaceous orifices. A remarkable example of this disorder is recorded by Crocker, the patient having been previously reported by Treves, and presented publicly as the "elephant man." In this case the skin was greatly thickened, hanging in folds, having irregular, lobulated masses of confluent tumors, and presenting the usual type of *mollusum fibrosum*. It is to these cases that the term *dermatolysis* has been applied. Somers¹ recorded a case in which a pendulous tumor, originating on the left side of the vulva and left buttock, hung nearly to the knee. The surface in these cases may show dilated blood-vessels and comedones, or present nevoid appearances. When occurring about the anal region, they present folds of tissue, which annoy the patient in defecation. Occasionally, a single large, pedunculated tumor is seen. In a given case tumors of all sizes and in all stages of development may be present.

The tumors may affect the mucous membrane of the mouth, the large nerve-trunks, suprarenal capsules, intestines, and other internal organs. Cooke² removed a large number of tumors from the rectum, which were identical in histological structure with the *mollusum* tumors of the skin found in the same patient. Not infrequently, various bones may also become involved in the process. Patches of leucoderma, telangiectasia, patulous orifices of sebaceous glands, comedones, and fatty tumors are not uncommon.

Pigmentations are usually light- to dark-brown colored freckles sprinkled over the entire cutaneous surface, together with a few large patches, in some of which jet-black points are at times observed. The freckles may be discernible in the negro. Wickham³ observed pigmentation in eight cases, and especially emphasizes its importance in this disorder. Oddo⁴ has reported two cases in which there were pigmentations of the mucous membrane of the mouth, resembling those commonly observed in the mouths of dogs. Weber⁵ believes, in common with a few others, that there are anomalous cases of von Recklinghausen's disease in which the pigmentary are the only changes, at least for certain periods of time. In the case as originally reported by Weber, only pigment was present; in the later report tumor-formation had begun. Little⁶ recorded a typical case in which the pigmentation preceded the tumor-formations by six years.

Hebra called attention to the low standard of physical and mental development in the subjects of this disease seen by him, a fact observed

¹ Occidental Med. Times, January, 1904, p. 19.

² American Medicine, November 21, 1903, p. 818.

³ Loc. cit.

⁴ Annales, 1906, s. iv, vii, p. 803.

⁵ Brit. Jour. Derm., 1905, xvii, p. 226; *ibid.*, 1909, xxi, p. 49.

⁶ *Ibid.*, 1908, xx, p. 413.

by many and well illustrated in several patients under the observation of the author.

The term *Achrochordon* (soft warts, *verrues charnues*) has been applied to that form of fibroma which occurs over the neck, face, and between the shoulders, chiefly in elderly people, and characterized by pinhead- to pea-sized, soft, pedunculated, mole-like lesions, which,

FIG. 132



Neurofibroma (von Recklinghausen's disease).

after undergoing involution, leave empty hernia-like sacs and small, wrinkled patches of the integument.

Hard fibromata (*desmoids*) usually occur singly, though several lesions may be present. They are noted on the trunk and extremities, and are usually round or oval in contour, firm, smooth, pea-sized nodules, deeply situated. They may occur at any age, even in child-

PLATE XIX



Fibroma Pendulum.

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PLATE XIX



Fibroma Pendulum.

hood, and may be present at birth. They gradually develop and show no tendency to undergo involution.¹

Etiology.—Multiple fibromata are not peculiar to either sex. The disease may be present at birth, or it may appear at puberty or even in early adult life. The cases with multiple lesions usually begin early, while those with single lesions are adult forms. The disorder may develop following surgical operations, during pregnancy, or after severe illness (malaria, dysentery), or it may develop in the absence of these factors. It has been described in association with certain developmental defects. Hintz² records von Recklinghausen's disease associated with adenoma sebaceum, and concludes that both disorders are due to faulty development. The association of adenoma sebaceum with the disease has also been recorded by Anderson³ and Jamieson.⁴ That heredity plays a part seems probable from the observation of cases in which the above defects of development and others are present; and also of families in which several members are afflicted, as well as those in which the disease has occurred in three successive generations. Trimble⁵ records a case of mother and daughter with the disorder. Friedlander⁶ says it is extremely probable that the disease is one of the nervous system, dating from intra-uterine life.

Pathology.—The tumor is a connective-tissue new-growth of peculiar character. It is described as myxomatous and as having a peculiar glassy appearance under the microscope. The fibers are usually finer and differ materially from the ordinary collagenous tissue of the corium. According to von Recklinghausen,⁷ the tumor originates in the endoneurium of the nerve-trunks in the subcutaneous tissue and spreads upward along the nerves, the vessels, the muscles, and the follicles, dividing into fine bundles and extending toward the epidermis. The growth is well defined and composed of a gelatinous connective tissue, with fine fibers in the small tumors, while in the larger tumors, on the outer portion, the fibers are coarser; but in the central portion of the tumors a gelatinous consistency is maintained, with an abundance of cells. These are spindle-shaped and round connective-tissue cells, presenting well-marked nuclei. According to Unna,⁸ the most striking constituent is a large mast-cell surrounded by a red halo, the latter being of the nature of spongioplasm and taking the same stain as the mast-cell granules. The blood- and lymph-vessels show dilatation. The glands of the skin are unaffected except as they are displaced by the new-growth. The epidermis shows no changes other than those due to compression from the tumor beneath.

¹ Heidingsfeld, *Jour. Cut. Dis.*, 1912, xxx, p. 332: Fibroma subcutis (Report of a case with a hard, subcutaneous nodule on the finger, which histologically was a pure fibroma).

² *Archiv*, 1911, cvi, p. 277; abstr. *Jour. Cut. Dis.*, 1912, xxx, p. 114.

³ *Brit. Jour. Derm.*, 1895, vii, p. 316.

⁴ *Ibid.*, 1906, xviii, p. 379.

⁵ *Jour. Cut. Dis.*, 1909, xxvii, p. 411.

⁶ *Loc. cit.*

⁷ Ueber die multiplen Fibrome der Haut, und ihre Beziehung zu den multiplen Neuromen. Berlin, 1882.

⁸ *Histopathology*, p. 847.

Diagnosis.—The tumors of molluscum fibrosum are to be distinguished from multiple cutaneous sarcomata by the violaceous or reddish color of the latter, with absence of pedunculation and greater tendency to ulceration, and by their evidently malignant character. From nodules of lepra they are distinguished by the entire absence of constitutional impairment and by their general development in far greater multiplicity. Tumors of molluscum epitheliale differ in their contents, their superficial location, and in the frequent presence of the dark puncta at their summits.

Neuroma is usually painful; lipoma less frequently multiple and pedunculated, commonly of larger size, having a lobulated structure, and presenting a "pillowy" sensation to the touch. Warty growths are readily distinguished by their verrucous summits; and the gummata of syphilis by the concomitant or prior symptoms of the existence of lues.

Treatment.—The treatment of large, single fibromata is surgical. Multiple lesions are often so numerous as to forbid such interference. In the major portion of cases treatment is of little avail. Fenton¹ reported improvement with fibrolysin; and Parounagen² reported improvement by the use of arsenic.

Prognosis.—Rarely one or more of the lesions disappears by spontaneous involution; more commonly they persist after their evolution is completed. Marasmus, tuberculosis, and a fatal result may occur. One or several of the tumors may become sources of danger from the occurrence in them of an active inflammation, with resulting degeneration and septicemic consequences. The disease, however, does not in many cases shorten life. In general, the prognosis of multiple fibromata may be regarded as unfavorable.

PARAFFIN PROSTHESIS.³

Since injections of paraffin have been made by many so-called "dermatological institutes" to remove wrinkles, form dimples, and otherwise change the natural contour of the face to suit the fancy of the patient, many untoward results are annually presented to the profession for correction. The proportion of patients who become victims of the peculiar new-growths that sometimes follow such injections cannot be stated, but it appears to be small compared with the large number treated. Surgeons have for several years employed paraffin to replace lost tissue. Since Gesuny first injected a quantity of paraffin, having a melting point of 40° C., into the scrotum to replace lost testicles, for the purpose of hiding the deformity in a candidate

¹ Brit. Jour. Derm., 1908, xx, p. 414.

² Jour. Cut. Dis., 1913, xxxi, p. 508.

³ Literature: Heidingsfeld, M. F., Histopathology of Paraffin Prosthesis, Jour. Cut. Dis., 1906, xxiv, p. 513 (with many references); idem: A further contribution to the histology of Paraffin Prosthesis, Jour. Amer. Med. Assoc., 1908, Sec. 12, p. 2028; Ormsby, Oliver S.: Tumor formations following paraffin-injections, Jour. Cut. Dis., 1907, xvi, p. 277; Williams, A. W.: Paraffinomata, Brit. Jour. Derm., 1907, xix, p. 432; White, C. J., Jour. Cut. Dis., 1909, xxvii, p. 313 (case report).

who contemplated taking the physical examination for entrance into the army service, surgeons have utilized the method to overcome various deformities. It has been used in the correction of sphincter incontinence, in hernia, to separate nerve-ends, to correct cleft palate, and many facial deformities, especially those about the nose. It is to the cases in which unsightly new-growths occur about the face following its use that this chapter is devoted. The following is a description of the clinical and pathological findings in several patients we have had under observation and treatment:

FIG. 133



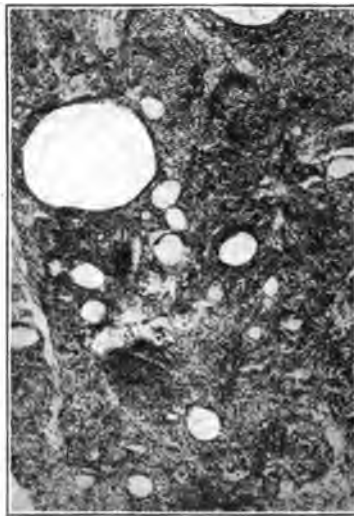
Paraffin prosthesis (cutaneous and subcutaneous lesions following).

There is commonly a period of time, varying from six to fifteen months, in which the tissues apparently do not rebel at the presence of the foreign material; then the new-growth begins. The sites of these deformities are usually at the angles of the mouth, about the chin, near the junction of the wings of the nose with the face, between and beneath the eyes, and on the upper part of the neck. The masses vary in size from that of a pea to a hen's egg and larger. They are firm in consistence, attached to the overlying epidermis, and embedded deeply in the subcutaneous tissues. In color they are bluish-red, at

times brownish-red, often covered with dilated blood-vessels; occasionally they appear not unlike keloid. They are, as a rule, unaccompanied by subjective sensations, but occasionally some discomfort is experienced, due to the pressure over the bony prominences. When occurring near the angles of the mouth, the prominence extends into the oral cavity, producing bulging of the buccal mucous membrane. Edema of varying degree is present in the surrounding tissues. The deformity produced in some of these patients is disfiguring to a marked extent and practically forbids their appearance among their fellows.

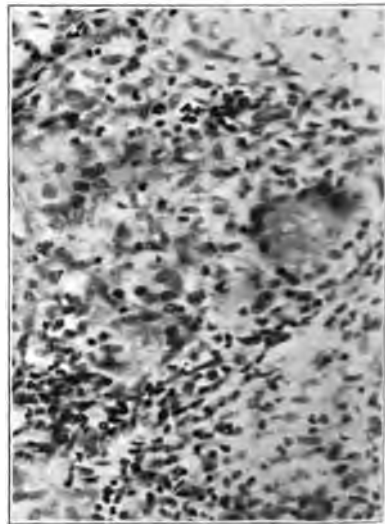
Histopathology.—The tumor is essentially a connective-tissue new-growth, resembling very closely the granulomata. With the low

FIG. 134



Section from tumor induced by paraffin. Low power, showing Swiss-cheese appearance and cellular infiltration.

FIG. 135



Section same as Fig. 134. High power, showing giant and other cells.

power of the microscope it presents a series of oval and round cavities, not unlike well-aërated Swiss cheese, as described by Heidingsfeld. These cavities represent spaces formerly occupied by the paraffin, which penetrated the tissues in numerous fine channels. The larger spaces were probably produced by the paraffin having been deposited in masses by rupture of the tissues. In addition to the fibrous bands and multinucleated cells, groups of connective-tissue cells are found. It appears probable that, owing to the highly vascular tissue in these areas, the foreign material is not encapsulated to such a degree as when deposited in the purely fatty tissue, such as occurs when injected in some of the regions referred to above, where surgeons employ it for cosmetic or other purposes.

Diagnosis.—The lesions resemble keloid and at times even lupus vulgaris. The hardness of the growth and the absence of the soft, apple-jelly-like, brown nodules of lupus distinguish it from this disease. The peculiar conformation, color, and size of the masses, together with the history of previous treatment with paraffin, serve as distinguishing features of the disease.

Treatment.—Complete excision surgically, followed by radiotherapy, has given best results. The paraffin must be totally removed or recurrence happens. Many other methods have been tried without success.

Prognosis.—After observing these cases for several years, no further changes have been noted. Heidingsfeld says that the natural goal is complete fibrosis. Malignant changes have not occurred, and the growths remain, unless removed surgically. The deformity is intense in some cases, causing much suffering and in one case self-destruction.

LIPOMA.¹

Fatty tumors occur in the corium and subcutaneous tissues and in the viscera, and are composed of fat-cells similar to those found normally. It is to those growths occurring in the corium and subcutaneous tissue that this chapter is devoted.

Symptoms.—These tumors may occur singly or as diffuse masses. The commonest sites are in the subcutaneous tissue over the shoulders and back. They also occur in the neck, both anteriorly and posteriorly; in the breast, gluteal region, and rarely on the face, scalp, scrotum, and labia. They may be small and flat, or nodular and lobulated, and vary in size up to that of a man's head. As a rule, the base is broad, but at times a pedunculated tumor is formed by the weight of the mass narrowing its base. The skin over the tumors is usually normal in color or slightly pigmented, and may be normal in thickness. The lobulated condition, which is characteristic of these growths, may be evident to the eye when they occur near the surface. As a rule, no subjective sensations are present, but at times, through pressure on the nerves, some pain is experienced. Secondary changes sometimes occur in the larger tumors, such as calcification, ossification, edematous changes, and liquefaction; oily cysts are thus sometimes found. The skin over the growth may necrose when secondary infection occurs, producing putrefaction.

That these tumors, though composed of fatty tissue similar to the normal, are independent of the general nutrition is shown by their persistence in wasting diseases (Virchow). They usually grow slowly and cause little inconvenience, but the small multiple and symmetrical variety often develops rapidly.

Etiology and Pathology.—The lipomata are rarely congenital; they usually develop between the ages of thirty-five and fifty years, and occur most commonly in the female sex. They are composed of groups

¹ Lexor-Bevan, *General Surgery*, pp. 796-805.

of fat-cells, which are slightly larger than the normal, held together by a capillary network forming small lobules. These are not so distinct as in normal fatty tissue, but are united by connective-tissue trabeculae into lobes and differently shaped masses. These tumors are enclosed within a connective-tissue capsule. The lobules are said to "bear the same relation to the nutrient artery as grapes do to the stem upon which they grow."

Diagnosis.—The important points in diagnosis are the position of the tumors, their slow growth, mobility, lobulation, and consistency.

FIG. 136



Lipomata (fatty neck).

Treatment.—The treatment consists in complete extirpation by surgical means.

Prognosis.—They are benign and do not recur after complete extirpation. They commonly grow to a given size, then remain stationary for years.

Adiposis Dolorosa¹ (*Dercum's Disease*).—This disease is commonly classed as a subvariety of obesity and is briefly referred to here for

¹ Dercum, Amer. Jour. Med. Sci., 1892, p. 521.

the reason that in some particulars the lesions resemble lipomata. It is a "disorder characterized by irregular symmetrical deposits of fatty masses in various portions of the body, preceded by or attended with pain." It occurs near middle life and in women. The fatty deposits may occur as large masses, which are soft in consistency. The hands, face, and feet are exempt. The true nature of the disorder is unknown. The neuralgic pains associated with fatty deposits are characteristic. Thin¹ describes two forms of multiple painful lipomata which he believes are closely related but not identical.

NEUROMA.²

Synonyms.—Tumor of the Nerves. Fr., Névrome; Ger., Neurom.

Definition.—Neuroma is a new-growth, consisting of one or several tubercles, developed in the skin and composed of elastic, fibrous, and connective tissue, with fibers of nerves.

Symptoms.—The description appended is a summary of the symptoms detailed in the reports of Duhring,³ Rump,⁴ and Kosinski⁵ of cases of neuroma affecting the skin primarily.

The patients were all men of middle life or advanced years, who exhibited upon the shoulders, arms, thighs, or buttocks numerous disseminated and defined, pinhead- to hazel-nut-sized, spherical or oval nodules or tubercles. They were either painful from the beginning, or painless at the outset and painful later; Rump's case, which was an example of the false neuroma of Virchow (*fibroid tumor of the nerve*), was an exception, in that there was no pain throughout the course of the disease.

The nodules, which were not arranged along the course of nerves, were immovable, dense, and elastic; they were fixed in the corium and extended below it. In color they were purplish or pinkish, and the skin between them was unaltered, or like that enveloping the lesions—dry, uneven, and desquamative. The tubercles were both tender and painful, the pain being excruciating, paroxysmal (usually lasting in Duhring's patient for an hour), and radiating. It was aggravated by temperature-changes, mental emotion, and bodily movement.

Pathology.—These tumors are composed of a mixture of fine connective tissue with medullated and non-medullated nerve-fibers; and should properly be called neurofibromata. Sections of the growth in Duhring's case showed anatomically a connective-tissue stroma, interwoven with fibers, for the most part lying parallel with one another,

¹ P. Thin: Adiposis Dolorosa and Painful Symmetrical Lipomata, Monatshefte, 1903, xxxvi, p. 281; abstr. Jour. Cut. Dis., 1903, xxi, p. 292. Osler, Modern Medicine, 1909, vi, p. 570.

² For a review of the subject, with full bibliography, see Krzyształowicz, Monatshefte, 1903, xxxvi, p. 421.

³ Amer. Jour. Med. Sci., 1873, lxvi, p. 413: Case of Painful Neuroma of the Skin; also supplement to the same, with cuts, ibid., 1881, lxxxii, p. 435.

⁴ Arch. f. path. Anat. u. Phys., 1880, lxxx, p. 177.

⁵ Centralb. f. Chir., 1874.

each fiber composed of a finely granular central substance surrounded by a sheath containing numerous elongated, oval, somewhat granular nuclei. There were also yellow elastic tissue; blood-vessels with thickened and nucleated walls; and about the latter lymphoid, cell-like bodies. There was entire absence of unstriated muscular and fibrillar connective tissue. The specimen represented the true amyelinic neuromata of Virchow. In Kosinski's case non-medullated nerve-fibers and connective tissue were also discovered. In both cases exsection of a portion of nerve (brachial plexus of the one, and small sciatic of the other) was followed by considerable diminution of pain and almost entire disappearance of the growths. In Rump's case, which, as stated above, represented the fibromated and so-called fibro-nucleated tumors of Virchow, the nodules were strung upon the same nerve "like beads upon a rosary," and were similarly displayed upon its branches. Spinal, cerebral, and sympathetic fibers were all involved.

Duhring, in commenting upon these rare cases, calls attention to the distinction between purely cutaneous lesions and the generally solitary, movable, and "painful subcutaneous tubercle."

Knauss¹ reports a case in a girl of eleven years. There were over sixty tumors, varying in size from a cherry to a hen's egg. They were situated beneath the skin, were firm and elastic, and never painful. Histological examination showed them to be composed of medullated and non-medullated nerve-fibers and numerous ganglionic nerve-cells.

MYOMA.

Synonyms.—*Leiomyoma*, *Dermato-Myoma*.

Cutaneous myomata are divided by Besnier² into two classes: simple myoma, or *leiomyoma*; and *dartoic myoma*.

Dartoic Myoma.—*Dartoic myoma* is much more common than the other form, and is of chief interest to the surgeon. It is usually single, though occasionally multiple, and occurs most frequently on the *mammæ*, the *labia majora*, the penis, and the scrotum. The tumor develops slowly, finally attaining a size varying from that of a small nut to that of an orange, and may be sessile or pedunculated. In most cases reported pain has been slight or absent, though it was marked in a case reported by Virchow. Under the influence of cold and local irritation, the tumor usually contracts, or may show a slow, vermicular motion. Some of these tumors are composed almost entirely of non-striped muscle-fibers; others are mixed with other tissues to form a *Fibromyoma*, an *Angiomyoma* (*Myoma Telangiectodes*), or a *Lymphangiomyoma*.

¹ Virchow's Archives, 1898, cliii, p. 29.

² *Annales*, 1880, s. ii, i, p. 25; and Besnier-Doyon translation of Kaposi, ii, p. 346 (with reference to all reported cases).

Simple Myoma.—Simple myoma is rare.¹ Its lesions are usually multiple and occur most frequently on the upper extremities, affecting chiefly the extensor surfaces; but they may occur on other parts of the body. They begin as minute round or oval macules or papules, which develop slowly to the size of a small pea or bean, occasionally becoming larger. At first readily effaced with the finger, later they become firm and elastic to the touch. They are usually limited to one or two regions of the body, where they appear in patches without definite arrangement or grouping, and are pinkish, reddish, or of the color of the normal skin. In the beginning the growths are usually insensitive, but in most cases after slow evolution become painful on pressure, and in some instances they are the seat of paroxysms of severe pain, which occur spontaneously and at irregular intervals. Nearly all the cases reported have been in elderly people and in men. Some of the tumors may undergo involution, but usually they tend to increase in size and in number. Histological examination shows that they are limited to the derma proper, and are composed chiefly of unstriated muscle-fiber mixed with some elastic tissue, with a few vessels and nerves. They are frequently developed about the hair-follicle, and are said by different observers to arise from the erector pili muscles, the muscular coats of the blood-vessels, or from vascular tissue in connection with the glands. By many their derivation cannot be traced. Moberg² records a case of single myoma, accompanied by the usual symptoms, and springing, according to this observer, from the muscularis of the vessels. Sobotka³ recorded the occurrence of an angiofibroma deeply situated, which was connected with the arrectores pilorum, and occurred in a patient with multiple myomata.

In a case under observation by Dr. Hyde, multiple pinhead- to large-bean-sized congenital tumors were situated near the sternocleidomastoid muscle of a girl nineteen years old. These were exquisitely sensitive to pressure, were capable of slight vermicular motion when irritated, and examination of the largest, after removal, disclosed smooth muscular fibers, and, in small proportion, terminal filaments of cutaneous nerves.

Diagnosis.—The diagnosis in well-marked cases is not difficult, but in some instances the recognition of the disease must depend upon a microscopical examination. Myomata have been mistaken for xanthoma tuberosum, for keloid, for lymphangioma tuberosum multiplex, and for neurofibroma.

Treatment.—The only successful treatment is by excision.

¹ For a *résumé* of cases see Crocker, Brit. Jour. Derm., 1897, ix, pp. 1 and 47; Roberts, *ibid.*, 1900, xii, p. 115; Morris, *ibid.*, 1901, xiii, p. 8 (a case shown before the London Dermatological Society); Marschalko, Monatshefte, 1900, xxxi, p. 313 (with survey of most of the previously published cases); Sobotka, Archiv, 1908, lxxxix, p. 323; Beatty Wallace, Brit. Jour. Derm., 1907, xix, p. 1: A case of multiple leiomyomata of the skin (a clinical and histological study, with illustrations and review of literature to date); Heidingsfeld, Jour. Amer. Med. Assoc., February 16, 1907, p. 562 (clinical and histological study. Review of the literature).

² Nord. Med. Arkiv., 1911, abt. ii, p. 65; abstr. Brit. Jour. Derm., 1912, xxiv, p. 375.

³ Archiv, 1913, cxvi, p. 79; abstr. Jour. Cut. Dis., 1913, xxxi, p. 592.

OSTEOMA CUTIS.¹

Synonym.—Osteosis Cutis.

Bony deposits in the skin and subcutaneous tissue may occur secondarily in certain diseases such as syphilis, and also as the result of trauma, examples of which may be seen in hod-carriers, in whom bony new-growths are sometimes found under the skin of the shoulder where the weight of the hod falls. Such lesions occurring spontaneously in the skin are rare.

There is now on record a series of five cases, and in each the true nature of the affection was not discovered until a microscopic study was made. These new-growths may be single and localized, or multiple with more or less generalized distribution. As to origin, some of the cases point strongly to their being due to misplaced embryonal cells, while others, especially those following diseases or produced by trauma, may be examples of metaplasia.

Coleman records the case of a patient six years of age who had a plaque of cartilaginous hardness, studded with tubercular nodosities, occupying about one-third of the external plantar surface of the left foot. The lesion at that time had existed for two and a half years. Upon microscopic examination the growth was demonstrated to be osseous. It is interesting to note that this growth recurred after surgical removal.

Salzer reported the case of a patient having a nodule in the scalp, which in the course of four or five years attained the size of a small coin. This lesion was freely movable and was excised on account of loss of hair in the area. The microscopic study of the case demonstrated its true nature.

Pusey records a case noted by F. G. Harris in which bone-formation was found in a scar following a laparotomy wound.

Under the title, osteoma cutis, Taylor and MacKenna described this unusual condition: The patient, a female child aged fifteen months, had several bony deposits situated in the skin of the limbs, scalp, and trunk. The largest occurred on the thigh and measured about one inch by three-quarters of an inch. The overlying skin was purplish in color and had several millet-seed-sized pearly spots on its surface. On palpation the plaque appeared well defined, hard, resilient, and elastic. When bent, it would resume its former shape after the pressure was removed. Many similar but smaller plaques were distributed about the cutaneous surface. Microscopic examination demonstrated the osseous nature of the deposits.

Heidingsfeld reported finding osseous formation in a pigmented nevus occurring on the chin of a male patient aged twenty-one years. In this study numerous bony particles were found, and the author ascribes the condition to misplaced embryonal rests.

¹ LITERATURE: Coleman, Warren: Osteosis of the Skin of the Foot, *Jour. Cut. Dis.*, 1894, xii, p. 185; Salzer: Osteoma of the Skin, *Langenbeck's Archiv*, xxxiii, No. 1; Pusey: The Principles and Practice of Dermatology, p. 847; Taylor, S., and MacKenna, R. W., Liverpool: Osteoma Cutis, *Jour. Cut. Dis.*, 1908, xxvi, p. 449; Heidingsfeld: Osteoma Cutis, *Archiv*, 1908, xcii, p. 337.

ANGIOMA.

The affections considered under this heading occur in two main groups: (1) angioma, which is characterized by a new-growth of the vessels; (2) telangiectasis, in which dilatation of preëxisting vessels occurs without new-vessel formation. Several classifications have been made from different standpoints. Kaposi, according to their varying characteristics, distinguished four classes: (1) telangiectasis; (2) nevus vascularis; (3) angioma elephantiasis; (4) tumor cavernosus. Unna makes still further subdivisions. Crocker and others describe these conditions under two headings: nevus vasculosus and telangiectasis.

FIG. 137



Angioma undergoing spontaneous cicatrization. (Fordyce.)

Nevus Vasculosus.—**Synonyms:** Nevus Vascularis, Nevus Sanguineus, Birthmark, Angioma. Fr., Angiome, Nevus vasculaire; Ger., Gefäßmal. The common type of angioma of the skin is variously known as *angioma simplex*, *angioma simplex hyperplasticum*, *capillary nevus*, and *cutaneous nevus*. These are present at or begin shortly after birth; are round or irregular in contour; and are elevated in varying degrees, at times to a marked extent. They vary in color from a bright-red to a deep-purple, and in size from a pin's-head to a large coin or larger. They are found on the face, head, neck, arms, and other portions of the body. They may be minute at birth and gradually grow to a certain size, then remain stationary. Occasionally, in the scalp of infants comparatively rapid growth occurs. Rarely,

they undergo involution, leaving delicate atrophic scars. When the lesions are composed of capillaries, they are more superficial and of a light-red color; when of veins, they are more deeply situated, and may be of large size, and smooth or lobulated, frequently the latter. They are frequently turgescient, erectile, and may be pulsating. When extending to the deeper tissues, nodular, polypoid, and lobulated masses occur, from which the blood may be pressed out, revealing a delicate skin covering the deeper, firmer portions of the tumor. This form has been called *elephantiasis telangiectodes* and also *angio-elephantiasis* (Virchow). When occurring upon the upper lip, the latter hangs down as an irregular, bluish fold over the mouth, and when occurring upon the ear may produce quite a deformity. The lesions

FIG. 138



Nevus vasculosus. (Fordyce.)

are temporarily increased in size by crying, excitement, or when placed in a dependent position.

Extensive angiomas of the type above described have been recorded by Ullmann,¹ in which millet-seed- to pea-sized, compressible nodules occurred. Kopp² recorded a similar case, with smaller nodules, situated on the scrotum and flexor surface of the limbs. Post³ recorded one with large nodules and lobulated masses occurring along the extent of one arm, with a few smaller lesions on the chest. Histologically,

¹ Archiv, 1896, xxxv, p. 100 (photo).

² Ibid., 1897, xxxviii, p. 69; abstr. Brit. Jour. Derm., 1897, ix, p. 416.

³ Jour. Cut. Dis., 1903, xxi, p. 498 (multiple angiomas).

they were pure hemangiomata. Occasionally, mixed cases occur, in which lymph- and blood-vessels are simultaneously involved (*angio-lymphangioma*), or blood-vessels and fatty tissue (*angio-lipoma*).

Another less common form is the port-wine stain (port-wine mark, birthmark, *nevus flammeus*, *Feuermal*, *tache de feu*), seen usually on the face and neck, less frequently on the trunk and limbs. The lesions may be of small size or cover large areas. On the face they are frequently unilateral and of large extent, sometimes invading the mucous membrane of the mouth. The surface is either smooth or dotted with small nodular tumors, with, in older cases, wart-like elevations at times. They are purplish-red or violet in color, and round or irregular in outline. Crying, coughing, and exposure to the cold produce changes in the color. With the diascope the latter may be entirely removed except for a slight brownish stain. A similar lesion, slightly developed, occurs very frequently on the back of the neck. According to Pollitzer and Depaul, this slight development of vascular nevus is present in about one-third of all new-born infants, but sometimes disappears spontaneously.

These nevi may occur singly or there may be a number, and exceptionally extensive development may occur. Pollitzer¹ recorded such a case, in which practically the entire cutaneous surface was covered with dime-sized lesions, so closely packed as almost to form a network. Crocker² pictured another occupying the right side of the face, with extension over nearly three-fourths of the body-surface.

Cavernous angiomata usually develop soon after birth, more rarely later in life. They may be either superficial or deep-seated, circumscribed or diffuse. They are lobulated masses, blue or bluish-black in color; and when deeply situated present merely a bluish, flat elevation, covered by normal epidermis. When not encapsulated, they spread into the surrounding tissues, involving even cartilage and bone. In structure they closely resemble the *corpus cavernosum* (Winwarter).

Etiology and Pathology.—The cause of these various conditions is not known. Vascular nevi occur in females more frequently than in males. The popular conception of prenatal maternal impressions, although apparently supported by evidence, is believed to have no significance, the striking examples being coincidences, rather than instances of cause and effect. Unna's theory of intrauterine pressure is supported by the occurrence of the congenital angiomata in regions where the fetal skin, such as that over the frontal and occipital regions and the surface of the knees, comes in contact with the bony prominences of the pelvis. Pollitzer³ adds to this the compression of the cutaneous vessels from an unusual degree of flexion or extension of the head or

¹ Internat. Atlas of Rare Skin Diseases; Fasc. xiv, Plate XLII.

² Atlas, Plate LVII, Nos. 3 and 4.

³ Amer. Textbook of Gen.-Urin. Dis., Syph., and Dis. of the Skin. Bangs and Hardaway, 1898, p. 1006.

limbs. This observer found lesions on the back of the head in 40 out of 114 new-born infants he examined. Depaul (quoted by Crocker), in a similar investigation, found the lesions in this situation in one-third of the cases. Virchow's fissural theory is supported by the occurrence of these lesions most abundantly in the position of the earlier fetal clefts.

Histologically, the vascular nevi have their seat chiefly in the superficial layers of the corium. In some instances they extend deeply and involve the hypoderm. The venous capillaries are chiefly implicated in the formation of vascular nevi (Virchow). The walls of the capillaries become thickened and, owing to endothelial proliferation, resemble the veins of the subcutaneous tissue. In the cavernous angioma the proliferation is most marked about the sweat-glands, hair-follicles, and fat-globules (Billroth). Embryonal vascular growths spring from these and as they multiply and develop are enforced by proliferation of connective tissue. Winiwarter¹ believes that they are developed in the same way as erectile tissue; namely, by a process of budding of solid vascular bodies from the walls of the veins, which become excavated and lined by endothelium.

Diagnosis.—The ordinary lesions of angioma are readily recognized by their color, size, shape, and obvious vascular constituents. Anderson calls attention to the importance of differentiating encephalocele due to the failure of ossification of the ethmoid and frontal bones at the root of the nose. Operations upon such tumors supposed to be angiomatous in character have resulted fatally. Lobulation, great distention (when a child is crying), a superficial rather than deep and complete vascularization of the smooth and glossy skin of the tumor, and a double pulsation, all point to frontal encephalocele.

Treatment.—The treatment of vascular nevi varies according to the type of lesion. The methods that are most satisfactory and chiefly employed are the following: refrigeration with carbon-dioxid snow or liquid air; cauterization by means of chemicals, electricity, or the actual cautery; radiotherapy, using x-rays or radium; electrolysis, and surgical procedures other than those above mentioned, such as excision and ligation.

In the capillary nevi, carbon-dioxid snow furnishes a simple and efficient means of treatment.² A stick or cylinder of the snow is moulded in shape to correspond with the lesion and is applied for from three or five to ten or twenty or more seconds. Care must be taken not to freeze the lesion too deeply, as this produces destruction of tissue further than is necessary, being followed by the usual symptoms of a congelation, dermatitis, and possibly sloughing. Only moderate pressure should be used and the freezing carried only to the point of whitening the angiomatous tissue. The color returns in a few seconds, after which reaction occurs, depending on the severity of the treatment.

¹ Die Chirurgischen Krankheiten der Haut. Stuttgart, 1892. Quoted by MacLeod. p. 261.

² Cf. section on Therapeutics for technique of preparation.

A crust commonly forms within three days, which falls between the seventh and fourteenth day, after which time, in case it is necessary, the treatment may be repeated. The most important factors in this treatment are the time of exposure and the amount of pressure exerted.

Liquid air may be substituted for carbon-dioxid snow, in case it is obtainable, and may be of greater service in certain cases. Its chief disadvantages are: (1) the difficulty or impossibility of obtaining it; and (2) its mode of application. Being a liquid, it has to be applied on a cotton or other applicator, and it is therefore somewhat difficult to limit the application to the lesion.

Electrolysis may be employed with advantage in certain of these cases, the technique being that employed for hypertrichosis (which see), except that the current is not broken until the needle or needles have been removed, the latter being gradually withdrawn, the electrolytic process being kept up until the needle makes its exit from the tissue, thus sealing the opening and preventing the hemorrhage which otherwise would occur.

In certain deeper cases *x*-rays may be employed, and in combination with other methods are of distinct value. Radium is highly recommended in all types of the disorder by Wickham.¹ The disadvantage in the use of *x*-rays and radium is the possible future development of telangiectasia in the area, which is disfiguring to a certain degree.

In the simple and superficial cases of angioma, pressure by means of flexile collodion, alone or combined with puncture, is recommended by Stelwagon,² who uses a triangular-edged needle, making the punctures from one-eighth to one-fourth of an inch apart, and employing proper aseptic precautions.

Nitric and other acids have been employed, using either a needle or pointed stick in making several punctures over the area, after which the lesion is dressed with an ordinary surgical dressing. Sherwell³ employs multiple puncture with a set of fine needles in a needle-holder similar to that used for electrolysis. These are dipped in a 25 to 50 per cent. solution of chromic acid, and then made to penetrate the part to be attacked. The bleeding is readily arrested by pressure, after which the patch is covered with several layers of flexile collodion. This procedure is of value in circumscribed patches of superficial character and relatively limited area. By it one can succeed in removing port-wine marks, with the result of producing a somewhat irregular cicatriform tissue much less disfiguring than the original blemish.

Other methods employed are the ligature, when practicable; puncture with incandescent needles; topical application of caustics other than those named above, such as potassium hydroxid, phenol, and corrosive sublimate; and total excision, the latter being practicable in relatively small growths. Larger growths also can be removed and

¹ Wickham and Degrais, *Radiumtherapie*, Paris, 1909. (For technique, *Cf.* section on General Therapeutics.)

² *Diseases of the Skin*, p. 685.

³ *Amer. Archives of Derm.*, 1879, v, p. 354.

the surface covered with skin-grafts. The galvano-cautery and the thermo-cautery are both valuable in the destruction of capillaries. The old method of multiple vaccination about and upon the involved area is sometimes followed by good results, but whether in consequence of the retraction of tissue under the influence of the inflammation excited, or of the destructive results of the suppuration induced, or of an indefinite caustic effect, is not clear.

The treatment of port-wine marks is only moderately satisfactory. Improvement may be made by several of the above methods. Their entire eradication is difficult. When perceptibly elevated, much more can be done than is otherwise the case. Liquid air, carbon-dioxid snow, and radium have given best results in this type.

Angioma cavernosum and other deeply situated angiomata require surgical interference.

Prognosis.—The prognosis may be formulated from what precedes. Excellent results, with practically no sequels, are frequently obtained in capillary nevi by treatment. The deeper lesions are followed by some scar-formation, and in rare instances may recur after surgical removal.¹ In port-wine stains the prognosis is guarded. Improvement can be promised, but complete eradication without atrophy is not possible in most instances.

Telangiectasis (*Acquired vascular dilatation*).—Telangiectases occur as localized or occasionally generalized vascular dilatations of pre-existing blood-vessels, associated at times with the development of new vessels. One of the common forms is that described as *nevus araneus*, "spider nevus," or the so-called "spider cancer." It is characterized by a central, slightly elevated, red dot or spot, pinhead-sized or slightly larger, from which fine blood-vessels radiate like the spokes of a wheel. Early it is hardly perceptible, but gradually becomes distinct, until a small, permanent patch is formed. Rarely the lesions may assume larger proportions. From one to several lesions occur as a rule, situated most frequently on the cheeks, beneath the eyes and on the nose; occasionally, they are seen on the neck, chest, and other parts of the body. They may develop spontaneously or follow slight trauma, such as a mosquito-bite,² or the injury caused by the forcible removal of a comedone. They are usually seen in women and children with delicate skins. Crocker³ records a case beginning in a boy of five, in whom they were still developing at the age of fourteen; and quotes a more generalized case recorded by Mandelbaum.⁴

Telangiectasia occurs in association with rosacea, xeroderma pigmentosum, chronic x-ray dermatitis, lupus erythematosus, angiokeratoma, morphea, syphilis, and other cutaneous disorders. It has been recorded in connection with exophthalmic goitre.⁵ It occurs also following continued exposure of the face to wind and sun, and in

¹ Post, loc. cit.

² Diseases of the Skin, p. 967.

³ Hyde, Brit. Jour. Derm., 1908, xx, p. 33.

⁴ Whitfield, Allbutt and Rolleston's System, p. 587.

⁵ Vierteljahr, 1882, ix, p. 213.

persons in whom a chronic congestion of the face is present from various causes.

Multiple telangiectatic areas on the face and body have been noted occurring in several members of one family, such a group having been studied by the author. A group of cases in which multiple telangiectases occurred in connection with epistaxis and other hemorrhages has been recorded by Osler, Weber, and others. These not infrequently occur in several members of a family.¹

Another form, papillary ectasis, or varices, occurs in people past middle life, chiefly about the trunk and upper part of the chest, as slightly raised, hempseed-sized, bright-red or purplish areas, resembling blood extravasation (Crocker), but consisting of tufts of dilated capillaries.

A very extensive case of telangiectasis was recorded by Frick.²

Treatment.—The treatment of telangiectasis is that of capillary angiomas, previously described. Electrolysis is the best method in most cases. In the telangiectatic vessels occurring in connection with various diseases, such as rosacea, this method gives excellent results. It is well not to employ it in cases of rosacea until after the inflammatory processes have been cleared up by other methods of treatment. In the so-called "spider cancer," the electrolytic needle is inserted in the centre of the lesion, which commonly seals the surrounding vessels at the same time. Only a moderate exposure to this process should be employed, on account of its scar-formation. A current of from one to one and one-half milliamperes may be used, and the needle should be removed as soon as the area becomes whitened, which only requires a few seconds, the needle being removed in the same manner as described in connection with the angiomas. Multiple scarification, as described in connection with lupus, is of value in many cases, and may be employed particularly in the marked telangiectasia occurring with rosacea. In the generalized cases treatment cannot be employed.

Nevus Anemicus.—Under this title Vörner³ described a peculiar condition of the skin characterized by white macules irregularly distributed over the cutaneous surface, of variable size up to that of a penny, of irregular contour, and presenting no subjective symptoms. When rubbed, slight redness occurred, which soon disappeared. Histologically, a partial or complete absence of blood-vessels was noted in the area. Stein⁴ found no histological changes demonstrable, and quotes Fischer as attributing the condition to a nervous disturbance of the vessel-formation.

¹ Colcott Fox, *Brit. Jour. Derm.*, 1908, **xx**, p. 145 (a case of bilateral telangiectasis of the trunk, with a history of marked epistaxis in childhood and a recent rectal hemorrhage; with review of the literature).

² *Jour. Cut. Dis.*, 1912, **xxx**, p. 334.

³ *Archiv*, December, 1906, **lxxii**, p. 391.

⁴ *Ibid.*, 1910, **ci**, p. 411: Ueber nevus anemicus.

ANGIOMA SERPIGINOSUM.¹

Synonyms.—Infective Angioma, Nevus Lupus.

This rare disease was first described and figured by Hutchinson,² under the title "A Peculiar Form of Serpiginous and Infective Nevoid Disease." Crocker³ described the disease under the title of "Angioma Serpiginosum."

FIG. 139



Angioma serpiginosum. (Fred Wise.)

¹ Wise, Jour. Cut. Dis., 1913, xxxi, p. 725, and Transactions of the Section on Dermatology of the American Medical Association, 1913, p. 177. In this article three cases are described, the clinical part by Wise, the histological by Pollitzer. In addition, there is a review of all the recorded cases (25) and the allied conditions, with a comprehensive study of the entire subject.

² Archives of Surgery, 1899, i, p. 289, Plate IX.

³ Brit. Jour. Derm., 1894, vi, p. 367.

The lesions of the disorder occur in several forms, which may, in certain cases, be restricted to one or more of the varieties, or in others to a combination of the entire group. The most striking lesions, according to most writers, are bright-reddish puncta, resembling grains of cayenne pepper, arranged in oval or circular rings, which are definitely outlined and are of varying sizes. Other lesions in the

FIG. 140



Angioma serpiginosum. (Fred Wise.)

neighborhood, termed "infective satellites," may be seen when the disease is spreading. Wise divides the lesions into seven types: (1) bright-red, pin-point dots, barely visible to the naked eye, but on account of their vivid tint standing out prominently and distinctly in contrast to the surrounding diffusely reddened skin; (2) areas of diffuse, uniform redness; (3) slightly raised vascular papules; (4)

delicate perivascular rings; (5) meshworks of irregularly curved and crooked lines; (6) pigmented lesions; and (7) atrophic spots. In addition to these, there may occur some branny desquamation. The eruption begins insidiously and progresses slowly, and any portion of the cutaneous surface may be attacked. The lesions, as a rule, are symmetrical, and entirely devoid of subjective sensations. The increase in the eruption is by the formation of new areas in the neighborhood of older lesions, with very gradual fusion. Crocker states that the cayenne-pepper-like grains, which consist of bright-red vascular points imbedded in the skin, are formed into groups, which spread peripherally, clearing in the centre, thus forming rings. In Wise's case the eruption increased by coalescence of new lesions springing from different centres. In the older lesions the skin presents a glistening, atrophic appearance. The eruptive manifestations of the disease sometimes begin in a vascular nevus. In a case observed by Hyde, in a female infant, the lesions developed as a consequence of a congenital nevus of the vulva. Others begin independently of such a lesion. Although in distribution the disease may become extensive, it produces no effect on the general health of the patient.

Etiology.—Nothing is known definitely concerning the cause of the disorder. One case was supposed to have originated in violent muscular exercise. In several of the reported cases the starting point of the eruption has been in a port-wine mark. The major portion of the cases have occurred in females, and it may occur at any age from infancy to sixty years.

Pathology.—Past histological studies have revealed very little of importance relative to the disorder. In Pollitzer's study, however, the findings are more conclusive. He sums these up as follows: There is a progressive perivascular infiltration of the papillary and sub-papillary layers in circumscribed areas, corresponding to the small, deep-red papules and the rings of the annular lesions. In these areas there is a proliferation of capillaries, as in inflammatory tissue, and there are marked endothelial proliferation and swelling. The elastic tissue appears normal; the collagenous tissue is somewhat degenerated. The epidermis, over the areas of infiltration, shows a high degree of intercellular edema, affecting the lower layers of the rete, and extending with diminished intensity as far as the stratum granulosum. The lower layers of the rete are invaded by the lymphocytic cells over the papillary infiltration. A few polymorphonuclear leukocytes are present, and many of the epidermic cells have undergone a vesicular and hydropic degeneration. There is no sign whatever of extravasated blood, as in a hemorrhagic process, or of widely dilated capillaries and veins, as in some forms of vascular nevus.

From these findings, the writer concludes that the essential process is a low-grade inflammation, affecting primarily the capillary areas of the papillary and subpapillary regions, with secondary effects in the epidermis.

Diagnosis.—The disease is to be recognized by the vascular puncta, and by their special tendency to grouping; the formation of circinate lesions; and by the peculiar manner in which the lesion gradually spreads. It is to be differentiated from purpura annularis telangiectodes, which disease is classed with it in Crocker's description. The latter occurs almost exclusively on the legs and is characterized by the presence of purpuric lesions and a history of the disappearance and recurrence of the lesions, points which do not occur in angioma serpiginosum. From simple telangiectases and certain cases of nevus vascularis it must also be differentiated.

Treatment.—The treatment consists only of surgical measures, either ablation or destructive cauterization.

Prognosis.—The disease in some cases, after reaching a certain stage of development, becomes arrested and remains stationary. In others the lesions disappear spontaneously, at least to a certain extent.

GRANULOMA PYOGENICUM.

Synonyms.—Botryomycosis Hominis, Granulomes à Pédicule bénin (Frédéric), Telangiectatic Granuloma (Kuttner).

The disease described under the above titles consists of small, pedunculated tumors, frequently occurring on the site of an injury. A group of four cases described as *Botryomycose humaine* was presented by Poncet and Dor¹ at the Congress of Surgery in Paris, in 1897. These authors identified the affection described by them with that described in 1870 by Bollinger as *Botryomycosis*, a disorder characterized by inflammatory tumors occurring on the scrotum and spermatic cord of horses following castration. Crocker² described the disease in 1903, under the title *Granuloma pyogenicum*. Hartzell³ first described the condition in America, reporting four cases. Wile⁴ recorded two cases and described and discussed the pathology and bacteriology. Lenormont⁵ and Heuck⁶ have recently made comprehensive reports of this disease.

Symptoms.—The disease is characterized by rapidly growing lesions, often occurring in the site of an injury. The lesions are described as pedunculated tumors, varying in size from that of a pea to a cherry or slightly larger. They are vascular and bleed easily. In color they are bright-red, bluish-red, or brownish-red. They are frequently moist and fleshy, or they may be mushroom-like. At times the surface presents areas of ulceration and necrosis, and is bathed in a purulent secretion. The tumors may secrete a foul-smelling, sero-purulent exudate, or may have some crust-formation. The surface is

¹ Congrès de Chirurgie de Paris, October 18, 1897; and Lyon Méd., October 24, 1897, and January 30, February 6, 1898 (abstr. Brit. Jour. Derm., 1898, x, p. 209).

² Diseases of the Skin, 3d ed., 1903, p. 1081.

³ Jour. Cut. Dis., 1904, xxii, p. 520 (résumé and literature).

⁴ Ibid., 1910, xxviii, p. 663 (résumé of French and German cases).

⁵ Annales, 1910, i, p. 161.

⁶ Zeitschrift, 1912, pp. 221, 324.

smooth, or may show crevices filled with pus, or be frambesiform. The lesions are benign connective-tissue new-growths, but tend to recur. Crocker states that they are exaggerations of what is popularly known as "proud flesh." The sites of predilection are the hand and foot, the lip, cheek, chin, shoulder, back, and umbilical region.

Etiology.—The cause is not definitely proven. Traumatism, followed by infection, is strongly suggested. Crocker believes they are produced by pus-cocci. Hartzell found only the ordinary yellow staphylococci of suppuration. Wile says: "The etiological factor is not a fungus, but probably the *Staphylococcus aureus*, perhaps in an unfavorable soil or in an attenuated form." In the original cases in animals, yellow granular masses were present, termed "botryomyces," which were thought to be the causative agent. Similar

FIG. 141



Granuloma pyogenicum. (The small tumor is the lesion.)

findings were made in the early cases occurring in man. After further research, this hypothesis was abandoned.

The disease has occurred at all ages, and about equally in the sexes. About one-half of the cases reported followed traumatism. There is no evidence of transference of the disease either from animal or man to man.

Pathology.—Practically all observers agree on the histological findings. The neoplasm is composed of granulation tissue, largely composed of young connective tissue and new-formed blood-vessels. The blood-vessels may be so large and so numerous as to suggest an angioma. The cellular infiltration is made up largely of connective-tissue cells. There are also varying numbers of mast-cells, polynuclear leucocytes, plasma and small round cells. In the different cases clumps of micrococci are also found in varying situations.

In addition to the microorganisms mentioned under etiology, the following have been found: *streptococci*, *Bacillus coli*, *Bacillus proteus*, and, finally, an *ameba*.

Diagnosis.—These neoplasms are to be distinguished from angiomas and papillomata.

Treatment.—Excision, followed by cauterization, is recommended. Radiotherapy has given perfect results in several cases treated by the author.

Prognosis.—The prognosis is good, but the possible recurrence should be remembered.

LYMPHANGIOMA.

In the present state of knowledge of this subject, it is not always possible to draw sharp dividing lines between lymphatic new-growths on the one side and simple lymphangiectasis on the other. It is probable that the two processes often are associated.¹

Lymphangiectasis.—Lymphangiectasis, uncomplicated by growth of new vessels, may occur in the superficial or deep lymphatics. When superficial, pinhead- to pea-sized, isolated or grouped vesicles form, which have the color of the normal skin, and disappear temporarily under pressure, and which do not break easily, but on rupture give exit to a continuous or intermittent flow of lymphatic fluid. Elliot² describes a case of this kind in which the vesicles bordered old scar-tissue and were seemingly identical in character with the lesions of lymphangioma circumscriptum, but histological examination showed them to be formed by simple dilatation of the lymphatic capillaries, due, probably, to mechanical obstruction.

Lymphangiectasis of the deeper vessels often produces no change visible on the skin and can then only be recognized by palpation; or it may be displayed in raised, irregular cords, or in chains of nodules. Türk³ records an idiopathic lymphangiectasis occurring on the penis of a patient, exhibited as a nodule 2 cm. long by 0.5 cm. in height. The histology was characteristic. Müller⁴ records a case of lymphangiectasis with lymphorrhea of the scrotum and elephantiasis of the leg. Following injuries or inflammation, it may be acute, but usually it is chronic, and occurs most frequently on the lower extremities and in parts in which the return current of the circulation is in some way impeded. The skin may become the seat of soft nodules, which may rupture and form lymphatic fistulæ; but more frequently the greatest changes occur in the deeper structures, resulting in elephantiasis, in phlegmon, or in lesions of periosteum and bone, the skin of the affected region being edematous, infiltrated, ulcerating, or cicatricial.

Simple Lymphangioma.—Simple lymphangioma may occur upon any part of the body in the form of circumscribed, elastic tumors,

¹ For review of literature of the subject, consult Francis, Brit. Jour. Derm., 1893, v, pp. 33 and 65.

² Jour. Cut. Dis., 1894, xii, p. 137.

³ Zeitschrift, 1912, xix, No. 2, p. 138; abstr. Jour. Cut. Dis., 1912, xxx, p. 692.

⁴ Archiv, lxxxii, 1906, p. 111; abstr. Brit. Jour. Derm., 1908, xx, p. 19.

made up of enlarged lymphatics, which are partly the result of dilatation of previously existing vessels and partly of new-formation. The skin over such tumors may be unchanged, or it may be reddened and thickened. Upon the tongue the condition is called *Macroglossia*, and upon the lips *Macrochilia*. In more extensive cases there is hypertrophy of the surrounding tissues, as in deep-seated lymphangiectasis. Many of the diffuse forms of lymphangioma constitute firm or lax tumors of such size as to be termed *Elephantiasis lymphangiectatica* or *Pachydermia lymphangiectatica*. These tumors often contain large lymph-filled sacs or lacunæ, enveloped in hypertrophied muscular and connective tissue, and an edematous integument. Some of the elephantiasic deformities of this character are fully as enormous as the extreme distortions of elephantiasis proper. In many instances there occurs an association of hemangioma and lymphangioma in the same area, the former receding, the latter progressing in time. An unusual example of lymphangioma with lesions simulating those of xanthoma is recorded by Gottheil.¹ He states that a similar case was previously observed by Thibierge. In the former case, degeneration of elastic tissue, characteristic of pseudo-xanthoma elasticum, was discovered in combination with the lymphangioma.

Simple lymphangiomata may be congenital.² Their cause is unknown. It is supposed that they are produced by toxic or other irritating influences. They are often the seat of a recurrent, circumscribed inflammation of erysipelatous type. Anatomically, the lesions are found to consist of greatly developed lymphatic vessels and spaces, lined with epithelium and enveloped in small-celled connective-tissue stroma. The treatment of the larger lesions only is surgical.

Lymphadenectasia is a name given by Virchow to tumors, usually in the axillary or inguinal regions, where the lymphatic vessels in the lymphatic glands dilate or multiply so as to form large lesions. The lymph-scrotum due to the presence of the *Filaria sanguinis hominis* is described elsewhere.

Cystic Lymphangioma belongs to the domain of surgery. It occurs in the form of multilocular cysts, usually congenital in origin and most frequently situated in the neck.

Lymphangioma Circumscriptum (*Lymphangioma cavernosum*; *Lymphangiectodes*; *Lymphangioma capillare varicosum*; *Lupus lymphaticus*. Fr., *Angiome cystique*). This is practically the only form of lymphangioma entitled to special consideration by the dermatologist. It is a rare form of skin disease and is illustrated well in the case reported by Morris.³ Cases have been reported by Török,⁴ White, Francis,⁵ Hartzell, Elliot, Gilchrist, Brocq and Bernard,⁶ Schnabel,⁷ and others.

¹ Jour. Cut. Dis., 1909, xxvii, p. 277.

² Vollmer, Archiv, 1903, lxxv, p. 343 (report of a rare case, with illustrations, histology and bibliography).

³ Internat. Atlas, 1889, No. 1.

⁴ Monatshefte, 1892, xiv, p. 169 (with critical review of previously published cases).

⁵ Brit. Jour. Derm., 1893, v, p. 33 (with review of literature).

⁶ Annales, 1898, s. iii, ix, p. 305 (full discussion of the subject, with review of the literature).

⁷ Archiv, 1901, lvi, p. 177 (with histology and references).

A number of typical examples have been presented before the New York, Philadelphia, Boston, and Chicago dermatological societies during the past ten years.

Symptoms. — The characteristic lesions are small, deep-seated vesicles, generally described as resembling frog's spawn. They are usually closely crowded in irregularly shaped groups, from 8 to 20 millimeters in diameter, with normal skin between. These groups have no regular arrangement or distribution. There are sometimes a few scattered vesicles about or between the borders of the

FIG. 142



Lymphangiectodes. (McEwen.)

groups, which may coalesce to form new patches. There are usually several of these groups, but they are confined, as a rule, to one small region of the body. The most common sites, according to Francis, who has collated reports of twenty-eight cases, are on the upper parts of the extremities and the mucous membrane of the mouth, pharynx, and tongue. A site not infrequently attacked is the axillary and scapular region (Bowen), a fact borne out in several of the American cases. In a large majority of the cases reported the lesions occurred on the left side of the body. The vesicles are deep seated, with thick walls, and vary in size from that of a pinhead to that of a small pea.

The newer and scattered vesicles may be colorless or have a yellowish or pinkish tinge. The skin over the older lesions may hypertrophy and produce growths that are easily mistaken for warts, and may even result in decidedly warty projections. Other lesions may be more or less covered with telangiectases and vascular dots or tufts, which may be present to such an extent as to obscure the primary vesicle-formation. When punctured, the lesions give exit to clear, colorless fluid, in greater quantity than the vesicles contain, which may be tinged with blood, the result of hemorrhage.

In some cases the lesions and skin about them become the seat of a recurrent inflammation of erysipelatous type,¹ such as not infrequently complicates other forms of lymphangioma. Probably as

FIG. 143



Lymphangiectodes.

a result of these attacks of inflammation, there are often infiltration, thickening, and even true hypertrophy of the deeper layers of the skin, forming a sort of local elephantiasis.

The disease in most cases reported began in early childhood and developed very slowly, often remaining stationary for years. In but one case has spontaneous involution been recorded.

Etiology.—As the disease usually makes its appearance in infancy or early childhood, it is probable that its origin is due to some congenital defect. It has appeared a number of times in connection with nevi, and has followed surgical operations, bordering the scars produced by the operator. It is possible that such cases are simple lymphangiectases of the capillary vessels due to blocking of the larger channels

¹ Cf. White's report, *Jour. Cut. Dis.*, 1894, xii, p. 474; also Bowen's article in *Twentieth Century Practice*, v, p. 687.

by the scar-tissue. The disorder not infrequently develops over or near the site of a deeply situated hemangioma or lymphangioma, and in some instances after surgical removal of the deeper lesion.

Pathology.—The vesicles, or cysts, are found on section to be situated in the upper part of the corium. These cysts are shown to have an endothelial lining, and undoubtedly are dilated or newly-formed lymph-capillaries. Immediately about the cysts and dilated lymphatics in an early uncomplicated lesion Bowen found considerable infiltration of round cells, but no other changes in the corium, while the epidermis was slightly thinned. In older lesions there is hypertrophy of the epidermal layers, and sometimes of the deeper parts of the corium. In other cases there are more or less dilatation and apparent new-growth of the blood-capillaries. This change in the blood-vessels may be slight, or so marked as to form the chief feature of the disease both clinically and pathologically. In consequence, confusing reports have been made by different observers regarding the structure and origin of these growths, many of which seem entitled to the name *hemato-lymphangioma*.

Diagnosis.—The disease can usually be recognized by the presence of the peculiar vesicles which give exit to lymph when punctured; by its occurrence in early life; by its slow and persistent course; by the presence often of warty and telangiectatic areas over its surface; and by its history of recurrence after most methods of treatment.

Treatment.—Radiotherapy offers the best hope of removal of the lesions without recurrence. Cases so treated successfully are recorded by Engman and Mook,¹ Hartzell and Knowles, the author,² and by Dore.³ Other methods more or less successful are the removal of the lesions by surgical measures and by electrolysis.

Prognosis.—The disease tends to persist after developing to a certain extent, varying in different cases. The intercurrent attacks of inflammatory processes are to be remembered. With treatment with x-rays, promise of complete eradication is good.

MOLLUSCUM EPITHELIALE.⁴

Synonyms.—Molluscum Verrucosum; Molluscum Sebaceum; Epithelioma Contagiosum; Molluscum Contagiosum (Bateman); Acné varioliforme (Bazin).

Definition.—Molluscum epitheliale, a rare disease first reported in 1817 by Bateman, under the title Molluscum Contagiosum, presents a more extensive literature than any of the benign tumors, because of the difficulty encountered in establishing the fact that it is not a disease of the sebaceous glands.

¹ Jour. Cut. Dis., 1913, xxxi, p. 266.

² Ibid., p. 267.

³ Brit. Jour. Derm., 1913, xxv, p. 191 (a case of Sir Malcolm Morris' entirely cleared up with four x-ray exposures).

⁴ For a complete review of the subject, with bibliography and additional research in the pathology and bacteriology of the disease, see White and Robey, Jour. of Med. Research, 1902, vii, p. 255.

Symptoms.—Typical epithelial mollusca are firm, roundish bodies, averaging in size the dimensions of a pea, and in color varying from a waxy-whitish hue, nearly that of the integument, to a dark-red tint when inflamed. They are either imbedded in the skin or project from it as smooth, firm, semiglobular, sessile or pedunculated tubercles. Usually, a dark-colored aperture can be detected at the apex or side of the lesion, from which, on pressure, milky and curd-like, semifluid contents can be made to exude. Occasionally, inspissated or even horn-like masses project from these orifices, as though forced out by a *vis-a-tergo*. The lesions are usually single and isolated, though hundreds may appear upon the person of one individual. They consist of semifluid collections derived from the hair-follicle or from percolation between the papillæ of the derma. They may be removed by surgical procedures, or be shed spontaneously; or inflame, and result in a circumscribed abscess; or terminate by ulceration. More often, they are insidious and slow of development, and may persist for years without producing annoyance or subjective sensation. They occur on the face, the side of the neck, and the nucha; on the penis and scrotum of men, and the breasts and labia of women; on the trunk; on the flexor surfaces of the extremities; the dorsal surfaces of the hands and feet; and not infrequently on the scalp in children.¹ In consequence of the depression of the centre of the little tumors (which Hutchinson has happily likened to small pearl buttons), they may suggest the lesions of variola; hence, they were described by Bazin under the term Varioliform Acne. This title, however, is by most writers employed to designate a totally different affection, to which a chapter is devoted in this work.

Hebra, Virchow, and Nicolaysen have reported mollusca as large as an orange or a small cocoanut. Microscopical examination of these gigantic lesions demonstrated their identity with the smaller tumors. Similar bodies of less size have been found interspersed among epitheliomata.

Etiology.—In England,² where the disease was first recognized, it is more frequent than on the continent of Europe. The contagiousness of molluscum is experimentally established, though the lesions are feeble in propagation by contact. Retzius,³ Vidal,⁴ Pick,⁵ and a few others succeeded in producing the disease by inoculation of the contents of molluscous tumors. The period of incubation after inoculation is from two to three months. The proofs of contagion, apart from experimental inoculation, rest chiefly upon the circumstances of lesions being simultaneously or successively observed on the breast of a mother and the face of her nursling; upon the successive development of mollusca in several members of one family; and in the occurrence of institutional

¹ Fox, Brit. Jour. Derm., 1908, xx, p. 266.

² For discussion of distribution and frequency of occurrence see Little: Brit. Jour. Derm., 1910, xxii, p. 180; Norman Wallser, *ibid.*, p. 284; and MacLeod, *ibid.*, 1915, xxvii, p. 12.

³ Deutsch. Klinik, 1872, p. 39.

⁵ Monatshefte, 1892, xv, p. 133.

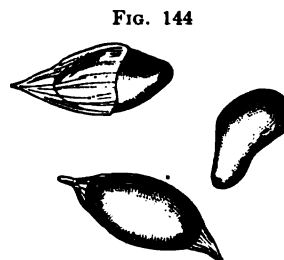
⁴ Progrès méd., 1878, p. 478.

epidemics.¹ Ehrmann² believes that the disease may be conveyed from one person to another by the *Pediculus pubis*. Fox³ cites seven cases in which operation wounds were infected with molluscum contagiosum. While usually of human origin, occasional transmission from the pigeon, dog, etc., is recorded.

Stelwagon⁴ has accumulated and classified reports of cases and of inoculations which seem to leave little doubt as to the parasitic nature of the disease, though no definite organism has yet been demonstrated in, or cultivated from, the growths. Kreibich⁵ found *Spirochete refringens* in genital lesions presenting a central depression. These were considered secondary, as in intact lesions no organisms were present. Eczema, sweating (Turkish baths),⁶ itching, and maceration of the skin predispose to the occurrence of mollusca.

Pathology.—Sections through the centre of a lesion of molluscum epitheliale show that it is formed by a number of diverging flask-shaped lobules, the small end of each lobule opening into a common central cavity. The lobules are separated from each other by a thin, fibrous partition, which may occasionally be demonstrated to be the remains of a papilla. The entire mass or group of lobules is surrounded, except at the surface opening, by a fibrous capsule, thus giving the entire structure an appearance very similar to that of a sebaceous gland. The belief, formerly held, that the process originates in the sebaceous glands is erroneous. Minute examination fails to find any trace of a sebaceous gland in these formations. The process begins as a proliferation of epithelial cells in the lower layers of the rete. The growth is confined to the rete, from which the flask-shaped processes are pushed out, causing a flattening and more or less complete disappearance of the underlying papillæ.

Each lobule is lined with a layer of palisade-cells continuous with the same layer in the healthy rete adjoining the growth, and it is filled with round and cuboidal nucleated epithelium undergoing peculiar changes. The first two or three rows of cells are usually normal, but above them the changes become gradually more marked. The exact nature, sequence, and signification of these changes are in dispute, but it would seem to be fairly well established that the outer part of the cell shows early in the process abundant granules of keratohyalin,



Molluscum corpuscles.
(After Kaposi.)

¹ Knowles, Jour. Amer. Med. Assoc., 1909, p. 173 (report of 59 cases in one institution); Hartzell, Med. Record, 1912, lxxxi, p. 1171: An epidemic of epithelioma (molluscum contagiosum), with some new observations concerning the molluscum bodies.

² Zweiter Internat. Derm. Cong., Wien, 1892, p. 284.

³ Westminster Hosp. Rep., 1909, xvi; abstr. Brit. Jour. Derm., 1909, xxi, p. 400.

⁴ Jour. Cut. Dis., 1895, xiii, p. 50.

⁵ Archiv (Referate), 1913, cxv, p. 385; abstr. Brit. Jour. Derm., 1913, xxv, p. 204.

⁶ Crocker (Dis. of the Skin, 3rd ed., p. 732), Morris (Dis. of the Skin, 5th ed., p. 677), and Little (Brit. Jour. Derm., 1910, xxii, p. 180) record cases following Turkish baths.

and soon undergoes cornification, forming a clear ring or capsule for the cell. Within, the changes have been considered similar to those seen in amyloid or colloid degeneration, but C. J. White¹ found that in over nine hundred sections the staining reaction of the molluscum bodies was identical with that of normal keratin. Authors describe a granular condition surrounding the nucleus, which is usually at one end of the cell, while the remainder of the cell-protoplasm shows vacuoles or groups of small, irregularly shaped, hyaline bodies, uniting to form an oval mass, which gradually encroaches upon and distends the cell. This oval, homogeneous corpuscle surrounded by a horny capsule forms the so-called "molluscum body." These bodies accumulate at the mouths of the lobules and in the small common cavity in which the lobules all open, and may be pressed out upon the surface of the skin in a yellowish or whitish, semifluid or waxy mass.

Hartzell² recently described new findings in cells taken from a very early lesion. He considered other possibilities than cell-degeneration in accounting for these changes. The more minute changes in the cells and the methods of recognizing them are given in detail by Unna and others. The theory that the disease is caused by psorosperms has been abandoned.

Diagnosis.—Mollusca resemble the lesions of variola more than any other cutaneous phenomena. They are, however, readily distinguished from the latter by their chronicity, their semifluid contents, the absence of febrile symptoms, and by the career of variolous pustules. From warts they are also differentiated by their contents, hemispherical shape, and the dark punctum almost invariably present on one part or another of the lesion.

Molluscum epitheliale in no way suggests molluscum fibrosum, with which it has been confounded only in consequence of the similarity in name. The tumors of molluscum fibrosum are solid new-growths, usually occurring in great numbers upon the trunks of individuals of adult years. They may attain enormous dimensions, the masses reaching several pounds in weight; and though in cases they degenerate by ulceration, they never enclose the curdy contents of molluscum epitheliale.

Papillary warts are to be distinguished from mollusca, though without question lesions are occasionally seen of a type intermediate between the two forms. Warts are to be recognized by their general papilliform character, and by their evident relation to the papillary layer of the corium overlaid by a thickened stratum corneum.

Physicians are occasionally consulted by patients who have discovered mollusca upon the genitals, and who suppose these lesions to be of venereal origin. An error in this respect can scarcely be committed by the expert. Neither the solid papule of the initial lesion of syphilis when observed on the skin of the penis, nor the pustule and resulting ulcer of the chancroid, exhibits the waxy appearance of genital mollusca, with their depressed puncta. In such cases the

¹ Loc. cit.

² Loc. cit.

inguinal glands should always be examined carefully, remembering, however, that a forcibly squeezed and cauterized molluscum may be accompanied by sympathetic adenopathy.

Treatment.—An efficient method of treatment consists in making multiple punctures in each lesion with a clean needle. Slight hemorrhage occurs. After several days the lesions disappear. When the tumors are few in number they may be removed by pressing out the contents through the central orifice. In some instances this slight operation is facilitated and rendered less painful by first making a linear incision over the growth. In children and others sensitive to the pain, the surface may be rendered anesthetic by the use of ice or ethyl-chlorid spray. Bleeding is arrested easily with a pledget of lint. Occasionally, after removal of the contents, the point of a crayon of silver nitrate may be introduced either to check hemorrhage or insure destruction of the cyst, or phenol may be introduced on the end of a pointed stick.

When the lesions are numerous, they may be made to exfoliate and disappear by the local application of green soap. Stelwagon recommends in such cases the use of an ointment containing 20 to 40 grains (1.3–2.6) of white precipitate or of sulphur to the ounce (30.), the ointment being rubbed vigorously into the affected parts once or twice a day. Davis¹ regards trichloroacetic acid as most efficient.

Prognosis.—The disease can always be terminated by removal of the tumors. The process should be repeated in case of recurrence.

XANTHOMA.

Synonyms.—Xanthelasma, Vitiligoidea. Fr., Plaques jaunâtres des Paupières.

This disease was first described by Rayer,² under the French title given above; by Addison and Gull³ as *vitiligoidea*; by Erasmus Wilson as *xanthelasma*; and by W. F. Smith, in 1869, as *xanthoma*, the name now generally accepted by writers. Through the work of modern investigators, clear distinctions have been made between the many varieties described, and in this text they will be treated under separate titles as distinct disorders, which the findings appear to justify and which the consensus of opinion upholds: first, xanthoma, a neoplastic disorder; second, xanthelasma (eyelid cases), a degenerative process; third, xanthoma diabeticorum, a form associated with glycosuria. These disorders are related chiefly in the common occurrence of a fatty substance in the lesions.

Xanthoma (*Xanthoma Multiplex*).—Xanthoma is characterized by yellowish lesions, occurring as nodules, plaques, or striae, situated chiefly about the large joints (elbows, knees, hips), unaccompanied by subjective sensations, and composed of fatty and fibrous elements.

¹ Jour. Cut. Dis., 1910, xxviii, p. 303.

² Traité prat. des Maladies de la Peau, Paris, 1836.

³ Guy's Hosp. Reports, 1851, 2d Series, vii, p. 268.

Symptoms.—The lesions occur as papules, tubercles, nodules, tumors, infiltrated plaques, striæ, or non-elevated, smooth, plane areas. The lesions of all the types are yellow or yellowish-red in color. They are usually grouped about the large joints (elbows, knees, and hips), but occur also over the small joints of the hands, the palmar and plantar surfaces, scattered irregularly over the trunk, and rarely, even in severe cases, upon the face. In certain cases, papules, nodules, plaques, and tumors may coexist along with plane lesions; and in

FIG. 145



Xanthoma.

these the greatest development will be seen about the joints, while upon the palms and soles striated lesions are commonly found. In rare instances, by enlargement and coalescence, the tubercles or nodules may form sessile or pedunculated, hazel-nut- to hen's-egg-sized tumors, which, as a rule, are firmer than the smaller lesions.¹ The

¹ Carry, *Annales*, 1880, s. ii, i, p. 75; Chambard, *Arch. de Phys. norm. et path.*, 1879, s. ii, vi, p. 330.

surface of the plaques or tumors may be irregularly furrowed or lobulated or become mushroom-like in shape. Not infrequently extensive cases occur in children.¹ In these the eruption is apt to be generalized, the lesions being papules or flat tubercles of varying shapes. Winfield² describes the development of a lesion of this type as follows: "First, it appeared as a pea-sized, brownish-colored macule, but one month later a pinhead-sized papule, which was hard, smooth, glistening, and pinkish-red, developed upon the site of the macule. It gradually en-

FIG. 146



Xanthoma.

larged, became darker in color and less firm in consistency, and when it had reached its full development (in about six weeks) was about the size of a large pea, soft and flabby in consistency, so that it could be picked up and rolled between the fingers. It was no longer glisten-

¹ Winfield, *Jour. Cut. Dis.*, 1909, xxvii, p. 112; Abrahams, *ibid*, 1909, xxvii, p. 224; Fischkin, *ibid.*, 1910, xxviii, p. 419.

² *Loc. cit.*

ing, but dull and furrowed, and the color ranged from a bright lemon-yellow to orange and saffron."

A remarkable case was recorded by MacLeod,¹ in which extensive xanthomatous sheets occurred in association with tumors about the joints. In this as well as in other extensive cases lesions were found on the eyelids. (It will be of interest to determine by a histological examination whether the eyelid lesions in such cases belong to the degenerative or the neoplastic type.)

On the palms and soles more or less extensive discoloration occurs. The lesions occurring in these locations are striking in certain cases. They occur as yellowish discolorations in lines in the normal creases of these regions, at times being sufficiently wide to give the appearance of narrow ribbons. While not elevated, they stand out in bold relief, on account of their peculiar coloration. In certain cases, the disease is accompanied by generalized coloration of the skin, of a peculiar yellowish shade, which has been variously interpreted as a xanthomatous dischromia and as a true icterus. (A woman presenting one of the extreme phases of this icteroid xanthomatous condition of the skin was shown at the International Dermatological Congress in London, in 1896.) Other organs of the body may be affected. Nodules may appear on the conjunctiva and cornea, in the mouth, and on the palate. In Rhode's case,² nodules developed in the trachea, causing obstruction to such a degree that tracheotomy became necessary, and the patient wore a tracheotomy-tube continuously. Nodules may also form in the bronchi, in the esophagus, the gastro-intestinal tract, on the peritoneum, pericardium, spleen, and large arteries.³ Lieberthal exhibited a young patient before the Chicago Dermatological Association with multiple lesions of xanthoma, in whom the sheath of the tendo Achillis was involved.

In rare instances, the disease may be exhibited as a single lesion, the so-called *Xanthoma solitarium*, and this may be situated in any of the locations commonly selected by the disorder.

The *Xanthoma planum* of writers indicates the same process in lesions that are distinguished by being imbedded in the skin rather than elevated above it.

Etiology.—The causes of xanthoma are obscure. In a few cases, the lesions have been observed first in early childhood, though they are encountered chiefly in adults. Women are affected more often than men. Many instances are on record in which several members of a family were affected. Török and T. C. Fox have each recorded families in which members of three generations presented the disease. The association of xanthoma with diseases of the liver, rheumatism, gout, ovarian disease, migraine, syphilis, carcinoma, hydatids, and other disorders cannot be denied, but it frequently occurs without such association. In rare instances, the disease is congenital, xanthoma-

¹ Brit. Jour. Derm., 1913, xxv, p. 344.

² Laryngoscope, October, 1906.

³ Cranston Low, Brit. Jour. Derm., 1910, xxii, p. 109: Xanthoma Tuberosum Multiplex, with Lesions in the Heart and Tendon Sheaths.

tous tumors being present at birth. McDonough¹ described a congenital xanthoma of endothelial origin. The lesions were lentil-sized; and at first were red in color, later becoming yellow. Some sort of hepatic disease has been described in about 50 per cent. of the recorded cases. Little² described a patient with xanthoma who was suffering with chronic cirrhosis of the liver.

Pathology.—The anatomy of xanthoma has been investigated especially by Chambard, Balzer, Touton, Török, Pollitzer, Whitehouse,³ Johnston, and others. The structure as described by all is similar, except as this changes at varying periods of the disease. In the interpretation of the findings wide divergence of opinion has been expressed. The chief changes noted are the presence of a large amount of fat contained in special cells, termed "xanthoma-cells," and in the increased connective-tissue growth, particularly in the later stages. The process by most authors is considered neoplastic rather than inflammatory. In a recent study made by Pollitzer and Wile,⁴ the authors state that there occurs in the earliest lesions proliferation of the cells in the immediate neighborhood of the papillary and sub-papillary vessels, together with an infiltration of a fatty substance into the perivascular and intercellular lymph-spaces. This is present also in the new-formed cells and in the endothelium of the capillaries and here and there in the basal layer of the epidermis. These new-formed cells are regarded by the authors as small, young xanthoma-cells, which in a lesion of larger size were found to contain two or more nuclei, and in certain instances a number, in which case they are considered xanthoma giant-cells. With proper stains, these cells were found to be almost entirely filled with a fatty substance, upon the removal of which the cells were seen to have a reticulated appearance. In the connective tissue surrounding these nests of xanthoma-cells, fibroblasts were present in large numbers. These also were seen to be filled with fat, in fine droplets and coarse clumps, upon either side of the nucleus, tapering out to fill the fusiform contour of the cell. In sections from older specimens, the xanthoma-cells had been reduced to a small number in proportion to the fibrous elements. Concerning the pathogenesis of this process, these authors conclude that xanthoma multiplex represents an irritative connective-tissue hyperplasia, in which extravasation of cholesterol-fatty-acid-ester present in excess in the blood serves as the stimulus. The occurrence of the above-mentioned lipoid in the blood in icterus and jaundice, together with its presence in great quantity in the tumors in xanthoma multiplex, affords, the authors believe, an explanation of the relation existing between these systemic disturbances and the cutaneous lesions. MacLeod,⁵ in a histological study of his extensive case, confirms the findings of Pollitzer and Wile.

Török concludes that the ordinary xanthoma-cell is formed of

¹ Brit. Jour. Derm., 1911, xxiii, p. 115.

² Jour. Cut. Dis., 1904, xxii, p. 470.

³ Loc. cit.

⁴ Ibid., 1909, xxi, p. 27.

⁵ Ibid., 1912, xxx, p. 235.

heterotopic adipose tissue, and that it is constituted, by reason of that heterotopia, of fat-cells of incomplete, interrupted evolution. Other observers look upon the process as being primarily an inflammation, which is followed by fatty degeneration of the cells.¹

The histology of the palmar striæ was studied by Johnston in the case of Whitehouse,² and corresponds in most particulars to that of the ordinary multiplex variety described above; the peculiarity of the process lying only in the fact that so small an amount of fatty deposit could produce so pronounced a coloration as was evident clinically.

Diagnosis.—The diagnosis from all other lesions is readily made when the peculiar yellowish or saffron-like changes of xanthoma, and the common situation, form, and general characteristics of its various lesions are considered. The difficulty lies chiefly in distinguishing the cases occurring in infants from urticaria pigmentosa with xanthoma-like lesions. A number of errors are recorded in this connection. As a rule, the cases of urticaria pigmentosa are mistakenly called xanthoma. The reverse of this, however, occasionally happens, as was seen in the case of Winfield.³ In urticaria pigmentosa the presence of dermographism, possible itching, pigmented areas, and, most important, the swelling, reddening and enlargement of the lesion when irritated, are important features. Finally, microscopically, the presence of a mast-cell tumor in the one and fatty masses in the other settles the diagnosis. Involution of the lesions of xanthoma is said to occur rarely. The major portion develop to a certain degree and then remain stationary throughout life. The chief concern is, first, the appearance of the lesions, and, next, the possibility of large tumors causing inconvenience.

Treatment.—Surgical procedure is indicated for the removal of large tumors. Other measures suggested in the treatment of xanthelasma may be employed in appropriate cases.

Xanthelasma (*Eyelid Xanthoma*). — The term *xanthelasma* was adopted for this variety of xanthoma by the American Dermatological Association at the thirty-eighth annual meeting, in 1914. Pollitzer⁴ had previously stated that xanthelasma would be an appropriate term for the eyelid form of the disorder. The disease is characterized by the occurrence in patients at or past middle age of one or several pinhead- to split-pea- or larger sized, yellowish, oval, soft lesions on the eyelids, usually near the canthi, with a tendency to remain permanently.

Symptoms.—Xanthelasma occurs in the major portion of cases on the skin of the eyelids, rarely on other parts of the face or neck. The lesions are pinhead- to pea-sized or larger, chrome-yellow in color, very slightly raised above the adjacent surface, and are of the

¹ Discussion of this question and a *résumé* of the literature, Brit. Jour. Derm., 1892, iv, p. 237.

² Loc. cit.

⁴ Jour. Cut. Dis., 1910, xxviii, p. 633.

³ Loc. cit.

same consistency as the neighboring tissue. They occur most frequently on the upper lid, at the inner canthus, in the form of a small patch, which may or may not be followed by several others near the outer canthus and on both lids of both eyes. The patches extend slowly, and, according to Pollitzer, in the direction of the long fibers of the orbicularis muscle. Occasionally, the chamois-leather-like areas may affect the entire upper lid, or the lower lid, or encircle the eye. In rare instances, these lesions develop on the nose, the cheeks, the ears, and the nucha. In one instance, Pollitzer saw a similar lesion over a large area on the outer anterior aspect of the neck below the jaw. The lesions develop very slowly and in time become stationary, and when once established do not disappear. They are rarely productive of subjective sensations, but are occasionally the seat of slight itching. As a rule, this variety develops at or after middle life.

Etiology.—Xanthelasma practically always occurs in people past middle life, and, as has been proven by Pollitzer, is a degenerative process; otherwise, no etiological factor can be suggested. In one case lesions of this type developed on the eyelid following an accidental contact with corrosive-sublimate solution (Hyde).

Pathology.—The process in xanthelasma is quite different from that described in xanthoma. Pollitzer¹ first called attention to the fact that this was a degenerative process, and not neoplastic. In a more recent article,² this author confirms his previous work, and his findings are briefly as follows: In xanthelasma the greater part of the cutis is literally filled with peculiar cell-like masses and bodies, known as xanthoma-cells. They are fragmented and degenerated remains of muscle-fibers with proliferated sarcolemma and nuclei. The xanthelasma cells resemble the cells of sebaceous glands, showing a reticulated structure filled with a granulo-fatty mass, with one or more round or oval, deeply staining nuclei. The fat, however, does not form a single large drop, which is common in the cells of sebaceous glands. In the larger cells there is frequently little structure, the cell being represented by the homogeneous granulo-fatty mass, within which there may be one or several nuclei lying without any definite arrangement. The various forms of these cells and their development from the muscle are well described by Pollitzer in this article. There also occurs a certain amount of yellowish pigment in various situations. The same author from his studies concludes that xanthelasma is in no way related to xanthoma multiplex, that it is the product of a peculiar fatty degeneration of muscle-fibers of the eyelids, and that it belongs not to the neoplasms but to the degenerations.

From his investigations of the disorder Pollitzer concludes that the myogenetic origin of xanthelasma explains (1) the absence of any clinical signs of tumors; (2) the practically exclusive occurrence in the eyelids, where peculiar muscular conditions exist; (3) its occurrence

¹ New York Med. Jour., 1899, ii, p. 73.

² Jour. Cut. Dis., 1910, xxviii, p. 633.

in symmetrical, discrete patches at the canthi of the lids; (4) its arrangement in elongated plaques, whose long axes are parallel to the course of the orbicularis fibers; (5) its usual development after middle age, when degenerative processes are apt to occur; (6) the peculiar yellow pigment, an invariable accompaniment of muscles undergoing fatty degeneration; (7) the disappearance in the affected area of the greater portion of the muscular tissue normally present in the eyelids; and (8) the microscopical structure of the tissue itself.

Diagnosis.—The presence of soft, yellowish lesions, limited to the eyelid region, occurring in adults in middle life, can scarcely be confused with any other disorder.

Treatment.—Erasion and excision are the usual methods of removing xanthelasma. Care should be taken in such operations to avoid a consequent ectropion, when the operation is performed upon the skin of the eyelids. The Paquelin knife is objectionable on account of the radiation of heat to the globe of the eye. With the tumor slipped through an aperture in a thin sheet of asbestos paper, such as is now found on the market, this danger may be obviated. Morrow employs 25 per cent. salicylic-acid plaster. Roberts makes a salicylated collodion paint—2 parts of salicylic acid, 1 each of chrysarobin and castor-oil, and 4 of flexible collodion.

The modern method of treatment by electrolysis, however, is preferable to others. The technique is the same as that employed for hypertrichosis and for the removal of soft moles. Besnier employs phosphorus internally, followed by turpentine, by which the course of the disease is said to have been relieved. Wilson, with the same end in view, employed nitro-hydrochloric acid, bitters, and blue pill. McGuire reports the removal of lesions by applications of monochloroacetic acid. Liquid air has been used with success by Dade.¹ Carbon-dioxid snow is of questionable value, but may be used.

Prognosis.—In xanthelasma the lesions without treatment remain permanently.

Xanthoma Diabeticorum.—Xanthoma diabeticorum is a rare cutaneous disease occurring, as a rule, in the subjects of glycosuria, characterized by the development on the skin of multiple whitish or yellowish globoid papules, with a reddish base, resembling pustules, and accompanied by mild subjective symptoms. Dilated capillaries are often noted over the papules, giving them a reddened appearance.

The disease was first described by Addison and Gull, in 1851, but was not separated from other forms until 1883, when Morris,² describing the fourth case, clearly differentiated it from other cutaneous affections.

Symptoms.—The lesions are usually multiple and exceedingly numerous, discrete or confluent, and not rarely grouped, pinhead- to pea-sized, firm, well-defined, conical or acuminate papules. At the apex may be recognized a yellowish centre with reddish areola.

¹ Jour. Cut. Dis., 1909, xxvii, p. 311.

² Pathological Transactions, London, 1883.

PLATE XX



Xanthoma Diabeticorum.



which may be made to disappear temporarily under pressure. The appearance, when viewed at some distance, is suggestive of a pustule. The lesions occur particularly over the buttocks, loins, elbows, knees, and extensor faces of the limbs in general, the scalp, face (brows, lips, nose), about the angles and over the mucous surface of the mouth, and the palms and soles. The eruption occurs suddenly, and the lesions are abundant at the outset. They may be firm, but are generally soft and compressible to the touch. Occasionally, they occur as punctate, linear, riband-shaped, or flattened lesions. Upon their involution, no trace of their existence is left. They may persist from several months to several years, or disappear comparatively soon. Under appropriate treatment, they undergo involution with surprising rapidity.

Etiology.—In the major portion of cases recorded, glycosuria has been recognized. This condition may follow the appearance of the lesions, or may precede it, the latter being the rule. Johnston calls attention to the fact that in nearly every case the patient has been described as stout, florid, or obese. The major portion of the patients have been male subjects and usually in a condition of fair nutrition. In other cases, especially in young subjects, there is malnutrition, and even cachexia. In yet other subjects, albuminuria, nephritis, and jaundice have been noted.

Pathology.—This has been studied by Morris and Clark,¹ Crocker,² Török,³ Schamberg,⁴ Johnston,⁵ Robinson, and others. Histologically, there is some resemblance between this disorder and xanthoma multiplex. The process is an inflammatory one rather than neoplastic. The xanthoma-cells, which are typically present, are fewer in number, and in the later stages there is less connective-tissue formation. Török states that the lesions of xanthoma diabetorum are caused by a local irritative process, resulting in a granulo-fatty degeneration. This view is confirmed by Johnston, whose findings may be summed up by the statement that the process in the diabetic variety is inflammatory, resulting in the degeneration *en masse* of the central portion of the papule. The xanthoma-cells, he states, are in reality giant-cells containing minute droplets of oil. From these findings, he believes there is no reason to class the two varieties together. In a later study, Johnston⁶ states that the nodule of diabetic xanthoma begins and remains localized throughout its whole course in the corium, appearing first as a sheath about the blood-vessels of the reticular portion and extending along them to the papillæ and subcutaneous tissue. These cellular sheaths consist of mononuclear cells of varied origin, and morphologically exhibited as lymphocytes, plasma-cells, fibroblasts, and endothelial cells. The latter are the so-called xanthoma-cells,

¹ Brit. Jour. Derm., 1892, iv, p. 237 (report of new case and review of the twelve in literature).

² Ibid., p. 253 (new case, with histology).

⁴ Jour. Cut. Dis., 1895, xiii, p. 202.

⁶ Ibid., 1900, xviii, p. 387.

³ Quoted by Johnston.

⁵ Ibid., p. 401.

from which giant-cells are produced by fusion or nuclear division. It is these cells which have undergone the fatty degeneration seen in this disorder. The connective-tissue cells become edematous and in some areas undergo hyalin degeneration; in other places they are replaced by free fat. The elastic tissue shows no changes. In conclusion, the author states that the process is an exudative inflammation, in which fatty change occurs, free fat infiltrating the tissues.

Diagnosis.—The important points in diagnosis in xanthoma diabeticorum may be summed up as follows: the sudden evolution and involution of the lesions; the presence of firm and solid, inflammatory, discrete or confluent papules resembling pustules; the yellowish color at the top of the papule, which may not be visible early; moderate subjective symptoms; the presence of glycosuria, as a rule; and the occurrence of the lesions, in addition to the regions mentioned, in the neighborhood of hair-follicles and sebaceous glands. Xanthoma multiplex differs from this chiefly in its slow development and the permanency of the lesions. The lesions of the latter are usually soft, and frequently striæ and patches occur. The yellow coloration is marked and distinctive. The subjective symptoms are absent. Jaundice may be present and glycosuria is not an accompaniment. Histologically, one is an inflammatory process with degeneration, the other a neoplastic growth.

Treatment.—The treatment of the disease, medicinal and dietetic, is largely that of glycosuria. Robinson's patient recovered after the use of small doses of Fowler's solution. Local treatment may be employed as indicated in any case.

Prognosis.—The prognosis is favorable. The majority of patients eventually recover.

PSEUDO-XANTHOMA ELASTICUM.

Synonym.—Xanthoma Elasticum.

This is among the rarest of cutaneous disorders, only a few cases having been recorded, the first by Balzer.¹ Other reports on the subject have been made by Besnier and Doyen,² Bodin,³ Little,⁴ and Dübendorfer.⁵

The lesions described in this disorder have been pinhead- to pea-sized, discrete, irregularly outlined papules, which may by fusion form patches of varying size up to that of the palm of the hand, meshlike or linear in outline. Their color is yellowish, somewhat resembling xanthoma. They occur on the abdomen, below the clavicles, near the axillæ, about the elbows, and occasionally on the thighs. The face, including the eyelids, the hands, and other areas selected by the xanthomata, have been free.

¹ Arch. de Phys., 1884, s. iii, p. 65.

² Translation of Kaposi, ii, p. 336.

³ Annales, October, 1900, p. 1073; abstr. Brit. Jour. Derm., 1901, xiii, p. 231.

⁴ Brit. Jour. Derm., 1908, xx, p. 194 (Pseudo-xanthoma of Balzer. Case report).

⁵ Archiv, 1903, lxi, p. 175; abstr. Brit. Jour. Derm., 1903, xv, p. 223 (Pseudo-xanthoma Elasticum and Colloid Degeneration in Scars).

In a histological study of the disorder it has been found to be a degenerative process affecting the elastin. A peculiar mononuclear giant-cell was observed by Bodin, and also hyalin degeneration. Balzer described the elastic tissue as occurring in large coils, chiefly around the follicles, forming the larger part of the tumor. The fibers were swollen, degenerated, and in parts broken and segmented.

The disease is distinguished from xanthoma clinically by the character of the lesions, which occur in areas not usually selected by xanthoma; and histologically by the absence of the peculiar xanthoma-cells and other evidence of fatty degeneration.

COLLOID DEGENERATION OF THE SKIN.¹

Synonyms.—Colloid Milium (Wagner); Hyaloma. Fr., Colloïdome miliaire (Besnier); Ger., Hyalom der Haut.

This disorder is among the rarer cutaneous diseases. It was first described by Wagner, in 1866, under the title of *Colloid Milium*. According to Hartzell, twenty-two cases are on record. It is a disorder characterized by lemon-yellow colored elevations of the skin, occurring usually upon the face.

Symptoms.—The lesions consist of pinhead- to millet-seed- or split-pea-sized, sharply circumscribed, irregularly rounded, flattish elevations of the skin, lemon-yellow in color, having a peculiar glistening, translucent appearance, suggestive of vesicles. They project but slightly from the skin, and on puncture give exit to a soft, gelatinous mass, at times accompanied by a droplet of blood. Some of them may be surrounded by very slight telangiectases. They develop slowly, often in groups, the individual papules remaining distinct even when two or more unite. Frequently, a papule becomes depressed in the centre; or becomes inflamed and covered with a crust, which falls and leaves a shallow depression, but not a true scar. The lesions, as a rule, occur on the upper two-thirds of the face, especially on the forehead and about the orbits. In C. J. White's² case the backs of the hands also were involved. In Hartzell's case the lesions extended over both malar eminences and across the nose, and there was some discoloration about the lower lip at the junction of the skin and the mucous membrane. There are no subjective symptoms.

Etiology.—The cause of the disease is not known. It occurs alike in men and women, usually after the forty-fifth year of age. A male patient aged twenty-five was seen at the clinic by Dr. Hyde.

Pathology.—The pathology has been studied by a number of observers.³ The chief and characteristic change found is the presence

¹ For full bibliography, cf. Hartzell, Jour. Cut. Dis., 1914, xxxii, p. 683: Report of a case of So-called Colloid Degeneration of the Skin.

² Jour. Cut. Dis., 1902, xx, p. 49 (with review of the literature).

³ For a discussion of the findings by the various writers and a consideration of the proper placement of these various cases, Cf. Hartzell, loc. cit.

of colloid degeneration to a greater or lesser extent in the corium. This is seen to affect the connective tissue and elastin, which may become involved over considerable areas. The changes are especially noticeable about the vessels and nerves and about the sebaceous and coil-glands. The glands themselves and all the epithelial structures except the endothelia of vessels (Balzer) usually escape. In sections examined by Hyde and Montgomery in the case mentioned above, a few rete-cells and a few cells of the coil-gland ducts were transformed into or infiltrated with colloid substance. The major portion of observers report colloid degeneration as occurring only in the mesoblastic structures: Hartzell summarizes the changes in his case as follows: (1) a marked thinning of the epidermis, the disappearance of a considerable number of the basal-cell layers, and colloid degeneration of the prickle-cells in various places; (2) complete disappearance of the papillary and subpapillary layers of the corium and their replacement by colloid material; (3) varying degrees of degeneration and destruction of the elastic tissue. He further states that the collagen and elastin are affected in an equal degree, and that his case demonstrated the fact that the cells of the epidermis share in the degeneration.

Diagnosis.—The disease may be confused with xanthoma, hydrocystoma, adenoma sebaceum, and multiple benign cystic epithelioma. A careful study of the characteristics of these various disorders, however, will in the major portion of cases be sufficient to make the diagnosis. In case of doubt, a histological examination should be made.

Treatment.—The nodules may be removed by surgical measures with a curette or by electrolysis.

CALCIFICATION OF THE SKIN.

This unusual condition was described first by Thimm¹ as occurring in the case of a male patient, aged twenty-three years. There was a hard, moderately elevated tumor of eight years' duration, one cm. in diameter, situated on the dorsal aspect of the proximal phalanx of the left little finger. The lesion was described as yellowish-white in color, having a warty centre, and formed primarily by the coalescence of hemp-seed-sized, whitish nodules.

The microscopical examination revealed masses of calcareous material in the situations of the pilo-sebaceous follicles, and also between the fibrous bundles of the corium. The fibrous elements formed in areas a framework for the chalky deposits. There was, in addition, the usual picture indicative of a chronic inflammatory process. The writer's conclusion was that, as the result of a sebaceous-gland

¹ On Calcification of the Skin, *Archiv*, 1902, lxii, p. 163; abstr. *Brit. Jour. Derm.*, 1903, xv, p. 223.

change, retention cysts formed, which later underwent calcareous degeneration.

In a case reported by Reines,¹ the rim of the right ear was involved. Histologically, the entire thickness of the cutis was occupied by a deposition of calcareous masses in a net-like granulation-tissue. Giant-cells were present in abundance. The pathogenesis of the condition he explains by assuming a degenerative change in the tissue preceding the calcification, which change was induced by some form of chronic irritation (pressure during sleep) acting upon a part having low resisting powers.

Calcareous degeneration is described by Gilchrist² and Stokes in peculiar bodies found in the lupus-like tissue. Calcareous deposits have also been noted in connection with milia. In addition, we have seen similar deposits about the elbows and other situations in scleroderma. Scholefield and Weber³ report a similar instance.

ADENOMA OF THE SEBACEOUS GLANDS.⁴

Synonyms.—Adenoma Sebaceum. Fr., Adénomes sébacés (Balzer and Menetrier), Adénomes sébacés cancroïdaux; Acné cancroïdale.

Definition.—This rare disease was first described by Balzer, but no importance was attached to the subject until Pringle⁵ described a case clinically, with a report of his histological study, and collected from the literature five similar cases. The disease is characterized by the occurrence (usually on the face, but also occasionally on other parts of the body) of small papules, telangiectasia, and occasional angiomata, associated with other nevoid conditions.

Symptoms.—The disease commonly begins in early childhood, although many cases are described in which it began at a much later date. The lesions are pinhead- to bean-sized papules or nodules, varying in color from yellowish-white to deep brownish-red. Many lesions are the color of the normal skin. Often their surface is vascularized by the presence of minute capillaries. They are usually discrete, but confluence sometimes occurs. They are situated chiefly on the face, over the cheeks, forehead, and particularly in the furrows beside the nose. In the majority of cases, other defects in the skin, such as warts, nevi, small papillomata, and pigment spots, are present; and many patients reported have been mentally deficient or epileptic.

¹ Archiv, 1907, lxxxviii, p. 267 (with résumé of the reported cases).

² Jour. Cut. Dis., 1903, xxi, p. 463: The Presence of Peculiar Calcified Bodies in Lupus-like Tissue.

³ Brit. Jour. Derm., 1912, xxiv, p. 200.

⁴ Darier, La Pratique Derm., tome i, p. 284. Jackson, Jour. Cut. Dis., 1909, xxvii, p. 307 (case demonstration). Hubbard, *ibid.*, p. 410 (case demonstration). Gottheil, *ibid.*, 1911, xxix, pp. 452 and 553 (case demonstration, mixed type). Sequeira, Brit. Jour. Derm., 1911, xxiii, p. 59 (case demonstration). Little, *ibid.*, 1909, xxi, p. 327 (case demonstration, normal mentality). Colwell, *ibid.*, 1909, xxi, p. 362 (case, with sections, demonstrated before the British Medical Association).

⁵ Brit. Jour. Derm., 1890, ii, p. 1.

In a number of the earlier cases recorded, congenital anomalies were noted, and in addition a low state of mentality has also been observed.

FIG. 147



Adenoma sebaceum. (Heidingsfeld.)

More recently, numbers of cases have been seen in people whose mentality was normal. The condition is said to be commonly found

FIG. 148



Adenoma sebaceum.

in asylums for the feeble-minded. Crocker states that a large proportion of the cases are chronic epileptics or imbeciles, and the disease

is not uncommon in idiot asylums. In a patient, a girl of fifteen, studied by the author, the disease had been present in typical devel-

FIG. 149



Adenoma sebaceum.

FIG. 150



Adenoma sebaceum. (Fred Wise.)

opment on the face for nine years. The intellectual development of this patient was above the average.

The course of the disease is slow, gradual development occurring for several years until puberty is reached, after which it remains stationary or disappears slowly, leaving temporary atrophic spots. The rule, however, is for the disease to persist.

Etiology.—The lesions appear to be developmental defects of the skin, which may, however, appear for the first time many years after birth. Females are more frequently attacked than males. The condition may be associated with other sebaceous disorders. It may rarely show some sign of heredity. Taylor and Berendt¹ recorded three cases in one family, and Adamson² recorded two cases in another family.

Pathology.—The chief change found microscopically is an increase in the sebaceous-gland and vascular elements, this increase fluctuating in different cases. In Pringle's early studies he found an enormous increase in the number and complexity of the sebaceous glands, which suggested a resemblance to the condition found in rhinophyma. McDonagh³ describes the corium as being filled with sebaceous-gland tissue, either fully formed or partly transformed from epithelial cells, from which the gland-cells take their origin. Sutton⁴ found in some sections merely a circumscribed hypertrophy of the sebaceous glands; in others from a larger growth he found true tumor-formation.

Diagnosis.—The history of the disease, which begins in early life and develops gradually; the persistency and permanency of the individual lesions, situated chiefly on the middle of the face and especially in the naso-labial folds; the frequent occurrence of telangiectases with the papules above described; the frequent association of other nevroid growths; and the absence of suppuration or ulceration, will usually suffice for a diagnosis. In colloid milium the lesions are usually few in number, are situated chiefly on the frontal and orbital regions, have a peculiar yellowish, translucent appearance, and are not so much modified by telangiectases. In multiple benign cystic epithelioma the lesions occur on the forehead and also on the trunk. In certain cases a microscopical examination is necessary to settle the diagnosis.

Treatment.—Neither internal remedies nor external applications have any influence upon the lesions. The treatment is, therefore, surgical and calls for the employment of the knife, the curette, or scarification, depending upon the size, number, and location of the lesions. In several cases the latter have been removed successfully by means of electrolysis, but there may be recurrence *in loco*.

¹ Brit. Jour. Derm., 1893, v, p. 360.

² Ibid., 1911, xxiii, p. 109.

³ Ibid., 1912, xxiv, p. 302.

⁴ Jour. Cut. Dis., 1911, xxix, p. 480 (A differential study of multiple benign cystic epithelioma and adenoma sebaceum in the negro).

MULTIPLE BENIGN CYSTIC EPITHELIOMA.¹

Synonyms.—Trichoepithelioma Papulosum Multiplex (Jarisch); Epithelioma Adenoides Cysticum (Brooke); Acanthoma Adenoides Cysticum (Unna). Adenoma of Sweat Glands (Perry).

This disorder begins, as a rule, at the age of puberty, and is frequently hereditary,² several members of two generations being sometimes affected. The lesions are conspicuous in their occurrence about the face. Brooke³ and Fordyce⁴ independently called attention to the origin of these growths being either from the basal layer of the epidermis or from similar cells of the hair-follicles. Hartzell⁵ and others confirm these findings. The lesions occur most often on the face—about the root of the nose, the temples, eyelids, cheeks, forehead, and chin; rarely over the neck, mammary glands, scalp, and upper extremities. There is a tendency for the lesions to be symmetrical, particularly about the face. They are minute, pearly, pale-yellowish or pinkish tumors, sometimes yellowish-red, occasionally having a bluish shade, and vary in size from that of a small pin-head to that of a pea, though much larger lesions occasionally develop. The larger lesions may have associated telangiectatic blood-vessels, and resemble to a degree the early lesion of rodent ulcer. They are firmly imbedded in the skin, project to a variable degree above the surface, are round or oval, solid and painless to the touch. The larger tumors are dense, lucent, and freely movable over the underlying tissue. In some cases the lesions are translucent and suggest in their appearance vesicles; in others, they closely simulate milia; in yet others there is a central depression, sometimes having a blackish point. The lesions are discrete and lie closely placed, in some cases showing none of the characteristic grouping. They develop slowly and continue to increase for a certain length of time and then remain stationary. As a rule, they do not ulcerate. Exceptions to this have been noted by White, J. C.,⁶ Jarisch,⁷ Stelwagon,⁸ Schamberg,⁹ and others. They are not, as a rule, the seat of subjective sensations.

Etiology and Pathology.—The disease occurs most often about the period of puberty, and in women more frequently than in men. In some cases there is a distinctly inherited tendency to the disease.

¹ LITERATURE (some references not given in the text): Perry, *Atlas of Rare Skin Dis.*, 1890, Part 3, Plate IX. Fox, *Brit. Jour. Derm.*, 1897, ix, p. 230 (case report). Gottheil, *Jour. Amer. Med. Assoc.*, 1901, xxxvii, p. 176. Hallopeau, *Annales*, 1890, s. iii, i, p. 872. Heidingsfeld, *Jour. Cut. Dis.*, 1908, xxvi, p. 18 (extensive bibliography). Ruggles, *ibid.*, 1910, xxviii, p. 248 (Multiple benign cystic epithelioma and fibroma in the same patient. Histology by Wende). Sutton, *ibid.*, 1911, xxix, p. 480 (a differential study of multiple benign cystic epithelioma and adenoma sebaceum). McDonagh, *Brit. Jour. Derm.*, 1912, xxiv, p. 295 (Tricho-epithelioma papulosum in a man aged forty-eight; ten tumors). Ricker und Schwalb, *Die Geschwülste der Hautdrüsen*, Berlin, 1914.

² Adamson, *Brit. Med. Jour.*, March 7, 1914 (Four cases of epithelioma adenoides cysticum (Brooke)).

³ *Brit. Jour. Derm.*, 1892, iv, p. 269.

⁴ *Jour. Cut. Dis.*, 1892, x, p. 459.

⁵ *Brit. Jour. Derm.*, 1904, xvi, p. 361.

⁶ *Jour. Cut. Dis.*, 1894, xii, p. 477.

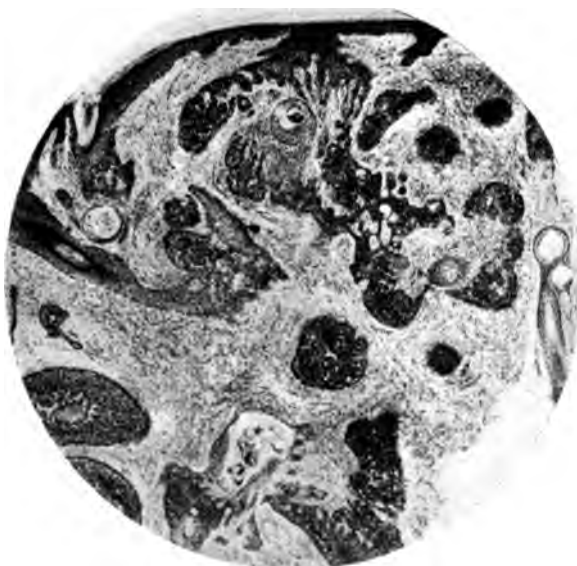
⁷ *Archiv*, 1894, xxviii, p. 163.

⁸ *Diseases of the Skin*, 7th ed., p. 652.

⁹ *Jour. Cut. Dis.*, 1909, xxvii, p. 170; *ibid.*, 1911, xxix, p. 500.

Since the studies of Brooke, Fordyce, Hartzell, and others, all observers agree as to the origin of these growths. Adamson¹ regards the tumors as embryonic hair-follicles, which are stimulated to growth at puberty. Earlier observers were of the opinion that they were due to misplaced epithelial cells of indifferent nature. The histological findings agree in the main. Brooke noted rope-like epithelial tracts or finger-like projections extending into the corium, sometimes forming coil-like masses, in which colloid degeneration occurred, producing oval and circular cysts; the masses being surrounded by a condensed connective-tissue capsule devoid of inflammatory reaction. Fordyce recognized irregularly rounded, oval, elongated masses and tracts of epithelial cells corresponding to those in the lowermost layer of the

FIG. 151



Multiple benign epithelioma (epithelioma adenoides cysticum) of the face, scalp, and upper part of the trunk, showing origin of new growth from surface of the epidermis (Spencer 1 inch. Spencer aplanatic ocular $1\frac{1}{4}$ inch). (Fordyce.)

epidermis and the external root-sheath of the hair-follicle. The epithelial masses were distinct or made up of intercommunicating bands or tracts, in some places resembling coil-ducts. "Cell-nests" were met with, as in malignant epithelioma, enclosing horny, granular, and colloid material. In addition, colloid degeneration was detected in individual cells of the cell masses. Adamson² classes rodent ulcer with multiple benign cystic epithelioma, and considers them both nevoid growths. Cases presenting the clinical association of the two types are recorded.³

¹ Loc. cit.

² Lancet, London, March 21, 1914, p. 810.

³ Dore, Brit. Jour. Derm., 1912, xxiv, p. 190 (A combination of a number of small typical lesions of multiple benign cystic epithelioma with several larger ulcerating tumors with a pearly edge and other characteristics of rodent ulcer).

Diagnosis.—The distinguishing features of the disorder are: its occurrence often in several members of one family, its date of onset usually being in childhood or adolescence; the presence of the major portion of the lesions on the face and head; their persistence, and occasionally their termination in ulceration and development into malignant epitheliomata. These points, taken into consideration with the characteristic lesions above described, will serve to differentiate the disease from adenoma sebaceum and syringocystoma, disorders with which it is most likely to be confused. From rodent ulcer occurring as a single lesion, no difficulty will be encountered, but in cases of multiple rodent ulcer the resemblance is close, the chief difference being the occurrence of rodent ulcer at a later period of life.

Treatment.—Neither internal remedies nor external applications have any influence upon the lesions. The treatment is therefore surgical and calls for the employment of the knife, the curette, or scarification, depending upon the size, number, and location of the lesions. In several cases the latter have been removed successfully by means of electrolysis. X-rays may be used in selected cases.

Prognosis.—As a rule, the lesions remain indefinitely without change. Exceptions occur as above noted, when epithelioma of a malignant nature develops, and this is to be remembered in forecasting the future progress.

SYRINGOCYSTOMA.¹

Synonyms.—Hidradénomes éruptifs (Jacquet and Darier); Syringocystadénome (Török); Epithéliome kystique bénin (Jacquet); Cellulome épithélial éruptif (Quinquaud); Cystadénome épithélial bénin (Besnier); Lymphangioma Tuberosum Multiplex (Kaposi); Syringocystoma (Neumann); Syringoma (Fiocco). Hemangio-endothelioma Tuberosum Multiplex (Jarisch). Ger., Schweissdrüsen—Adenom mit Cystenbildung.

A group of rare cases has been recorded, the first by Kaposi,² under the title *lymphangioma tuberosum multiplex*; others under the titles mentioned above, the type for these being probably best illustrated by those described by Darier and Jacquet.³ In America studies have been made by C. J. White,⁴ Sutton and Dennie,⁵ the author,⁶ and others.

Much confusion has existed relative to the relationship of this disease to multiple benign cystic epitheliomata. The latter has been

¹ Darier, *La Pratique Derm.*, 1900, i, p. 288. Jacquet, *Congrès Intern. de Derm.*, Paris, 1889. Neumann, *Archiv.*, 1900, liv., p. 3. Brauns, *ibid.*, 1903, lxiv, p. 347. Fiocco, *Giorn. ital.*, 1904, p. 3. Besnier, *Translation of Kaposi's Treatise*, ii, p. 367. McDonagh, *Brit. Jour. Derm.*, 1912, xxiv, p. 228 (Syringoma. Patient aged twelve years; lesions developed at end of first year). Sequeira, *ibid.*, 1913, xxv, p. 140 (Hidradénomes éruptifs (syringoma)).

² *Handbuch*, 1872, ii, p. 282.

³ *Annales*, 1887, s. ii, viii, p. 317.

⁴ *Jour. Cut. Dis.*, 1907, xxv, p. 49 (full bibliography, 4 plates, 6 histological photographs).

⁵ *Jour. Amer. Med. Assoc.*, 1912, lviii, p. 333 (A clinical and histological study and comparison of a case of multiple benign cystic epithelioma and syringocystadenoma. Bibliography).

⁶ *Jour. Cut. Dis.*, 1910, xxviii, p. 433.

clearly worked out by Brooke, Fordyce, Hartzell, and others, and should be readily differentiated. The clinical picture of the syringocystoma group is fairly well differentiated from the others, although some writers believe the distinctions are not important.

Symptoms.—The patients are for the most part women in early life. The lesions are situated on the trunk, over the clavicles, shoulders, and chest, and about the axillæ, extending from the latter position over the abdomen and occasionally over the extremities; more rarely over the face, eyelids, nose, ears, and scalp. The lesions are pinhead-to split-pea-sized and sometimes larger, round, smooth, globoid nodules, in some cases discrete, in others closely packed, soft in consistency, fawn-colored to yellow in tint in some instances, lighter in others, and in still others of a reddish, brownish, or darker hue, occasionally presenting a somewhat waxy appearance. They are nearly level with the skin or slightly elevated above it.

The course of the disease, when not removed by treatment, is toward persistence of the lesions after attaining a maximum development. There are few, if any, subjective sensations, and the general health of the subject of the disease is unimpaired. The involvement of the sweat-apparatus was indicated clinically in White's case by diminution in the production of sweat. On the other hand, Sutton found the glands capable of functioning.

Pathology.—In the pathogenesis of the disorder it has been suggested that the new-growth is derived from misplaced embryonic coil-elements, a theory corresponding closely in principle to that given in explanation of the production of multiple benign cystic epithelioma which was suggested by Quinquaud and Jacquet, who considered that misplaced epithelial cells of indifferent nature were responsible for the growths. White¹ believes syringocystoma is a hyperplastic and hypertrophic change in previously existing efferent sweat-ducts. Stockmann² regards these growths as tardy nevi developing in abnormally placed sweat-glands.

The histology has been studied by Jacquet, Darier, C. J. White, and others. In the case of Jacquet and Darier, pathological changes were noted in the corium, where there occurred epithelial cylindrical ramifying prolongations, which on section showed canals and cysts containing amorphous matter. These newly-formed elements extended from a short distance below the epidermis to the hypoderm and were not encapsulated. There was never traced any direct connection between these tubules and the sweat-apparatus, nor were they traced to other structures of the skin. A double layer of cells about a simple channel and other facts obtained from a study of the sections caused Darier to ascribe their origin to the sweat-ducts.

The histological changes in White's case are described as occurring between the subpapillary layer of the corium and a point just

¹ Loc. cit.

² Archiv, October, 1908, xcii, p. 145; abstr. Jour. Cut. Dis., 1909, xxvii, p. 138 (report of three cases).

PLATE XXI



Syringocystoma.

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¹ Loc. cit.

² Archiv, October, 1908, xcii, p. 145; abstr. Jour. Cut. Dis., 1909, xxvii, p. 135 (report of three cases).

PLATE XXI



Syringocystoma.

above the panniculus adiposus. Within this area clusters of epithelial cells forming bodies of various shapes were noted, and the supporting corium exhibited some degenerative changes. In the centre of some of these masses true cysts with atrophic cells were noted, but for the most part an empty lumen was observed.

Sutton found the cells still retained their sweat-secreting function, and concluded that the tumors were true adenomata.

Diagnosis.—The diagnosis is to be established chiefly from multiple benign cystic epithelioma, the softish nodules of syringocystoma, with their general hue, distribution, and lack of pearly elements, rendering the clinical recognition facile. In typical cases, papular syphilodermata are, as a rule, accompanied by other signs of lues. The xanthomata have a yellower tint, but in many respects strongly resemble the lesions of syringocystoma.

Treatment.—Treatment has been of little avail in most cases. Locally, the lesions may be removed by surgical measures, by electrolysis, by liquid air, or by carbon-dioxid snow. Hodara,¹ Max Joseph and Siebert,² the author, and others have successfully treated these cases with x-rays.

Prognosis.—After developing to a certain extent the lesions remain indefinitely. They do not undergo spontaneous involution, nor do they develop malignant changes, and they have no effect on the general health.

XERODERMA PIGMENTOSUM.³

Synonyms.—Angioma Pigmentosum et Atrophicum; Atrophoderma Pigmentosum; Dermatosi Kaposi; Melanosis Lenticularis

¹ Derm. Wochenschr., 1913, lvi, No. 15, p. 421; abstr. Jour. Cut. Dis., 1913, xxxi, p. 791 (A case of hidradenoma eruptivum (Darier and Jacquet, syringocystadenoma)).

² Derm. Wochenschr., 1913, lvi, No. 15, p. 425; abstr. Jour. Cut. Dis., 1913, xxxi, p. 792 (Successful treatment of hydrocystoma tuberosum multiplex).

³ Kaposi, Wien. med. Wochenschr., 1885, p. 1334. White, J. C., Jour. Cut. Dis., 1885, iii, p. 353. Bowen, A. H., Jour. Amer. Med. Assoc., April 29, 1889. Pollitzer, Jour. Cut. Dis., 1892, x, p. 133 (histological study in one of Crocker's cases). Brayton, ibid., p. 129. Kaposi, Twentieth Century Practice, v, p. 727. Lukasiewicz, Archiv, 1895, xxxiii, p. 37 (résumé of 73 cases and bibliography). Herkheimer u. Hildebrand, Münch. med. Wochenschr., 1900, xlviii, p. 1099 (abstr. Brit. Jour. Derm., 1901, xiii, p. 66). Kreibich, Archiv, 1901, lvii, p. 123. Monthus, Annales, 1902, s. iv, iii, p. 673. Michael Terterjans, Inaug. Dissert., Berlin, 1902. Löwenbach, Mraček's Handbuch, Bd. iii, p. 240 (full bibliography). Crocker, Diseases of the Skin, 3d ed., p. 681. Hyde, Jour. Cut. Dis., 1903, xxi, p. 573 (three cases of xeroderma pigmentosum; these illustrate the disease in this text). Förster, Deutsche. med. Zeit., 1904, No. 74, p. 77. Adrian, Centralb., 1904, vii, p. 130. Nicolas and Favre, Annales, 1906, s. iv, vii, pp. 536-549. Klein, Inaug. Dissert., Strassburg, 1906. Terebinski, Russki. Wratsch., 1906, No. 48. Askura, Japan. Zeits. f. Derm. u. Med., 1906, p. 1 (two cases). Low, Zeitschrift, 1906, xiii, p. 488. Vignolo-Lutati, Monatshefte, 1907, xlv, pp. 21 and 72. Josef Yussman, Centralb., 1907, x, p. 258. Rouvière, Annales, January, 1910, p. 34 (three cases, sisters, five other members of same family not affected; one died soon following glandular enlargement, one cured with x-rays). Fox, G. H., Jour. Cut. Dis., 1910, xxviii, p. 200. Fox, Howard, ibid., 1911, xxix, p. 599 (adult case). Carmichael, ibid., p. 307. White, C. J., ibid., 1912, xxx, p. 290. Toyama, Jap. Zeits. f. Derm. u. Neurol., 1912, xxi, No. 4, p. 24 (this author collects 33 Japanese cases, which he adds to 196 previously recorded in the literature). Gottheil, Jour. Cut. Dis., 1913, xxxi, p. 515. Simpson, C. A., ibid., p. 1020 (three cases). Corlett, ibid., March, 1915, xxxiii (Xeroderma pigmentosum following severe exposure; two cases, one adult). Grindon (three cases shown at the 38th Annual Meeting of the American Dermatological Association, Chicago).

Progressiva; Lioderma Essentialis cum Melanosi et Telangiectasia; Lentigo Maligna. Fr., Epithéliomatose pigmentaire.

Definition.—Xeroderma pigmentosum is a rare disease first recognized and described by Kaposi, in 1863, on the basis of two cases seen by the elder Hebra and himself. This number was increased by two in the year 1870. The disorder is characterized by a striking symptom complex, occurring for the most part in young children, exhibited as hyperpigmentations, atrophic areas, telangiectases, and new-growths, warty and carcinomatous. These lesions occur usually in combination, and to the most pronounced degree on the exposed parts of the body, the face, neck, hands, and forearms. More than 230 cases have been placed on record in different countries. Cases

FIG. 152



Xeroderma pigmentosum.

have been recorded in America by Taylor, Duhring, C. J. White, Bronson, Brayton, Hutchins, Bowen, Carmichael, G. H. Fox, Howard Fox, C. A. Simpson, Gottheil, Corlett, Hyde, Grindon, and others.¹

Symptoms.—The disease begins most often early in life, from the third to the fifth month to the close of the first year, though it has been observed first in adults, and even at an advanced age. Some doubt, however, exists as to the occurrence of the classical features of the malady in the cases developing at these later periods.

¹ Additional cases of the disease have recently been observed in Missouri and Iowa. In the former, seen by Dr. J. Frank Waugh, two children of one family are affected, a third having succumbed to pneumonia. In the second group, seen by Dr. J. B. Kessler, there were two patients of the same family affected.

At the outset, the mothers of children and some observant physicians have seen an erythematous redness, diffuse or in circumscribed macules, over the regions later characteristically involved. C. J. White and others report lesions developing on a well-defined sunburn; the early lesions in these cases being usually a freckling. This symptom, moreover, is usually the first sign of the disease in most cases, the lentigines being scarcely, if at all, different from those resulting from exposure to light in persons who suffer from that form of pigmentation. This freckling or pigmentation in almost every instance involves the exposed surfaces of the body, more particularly

FIG. 153



Xeroderma pigmentosum.

the face, neck, upper chest as far as the third rib, the hands, and the forearms from the upper third as far as the finger-tips, including to a minor extent the flexor aspect of the arms and palms. In one of the patients shown in illustration Fig. 152, there was a distinct triangulation of pigmentation, the apex of the triangle below extending down the back nearly to the sacrum. Occasionally, the thighs, the legs, the scalp, the subungual spaces, the dorsum of the foot, the trunk, and buttocks may likewise be involved. The pigmentation in these cases differs as to hue with the age of the patient and the severity of the disease, the color ranging from a light fawn-yellow to a deep

chocolate-brown. The lentigines may be isolated, which is the rule; or be found in areas of one or several centimeters in diameter. The patients are commonly of a blond type, with reddish or light-tinted hair and blue or lightly pigmented irides; in short, of the class chiefly disposed to freckling.

Interspersed among the lentigines are equally characteristic whitish, atrophic spots, usually less pronounced than the lesions described above, which may be isolated or coalesce into cicatriform patches. When sparse, they are somewhat lucent, slightly wrinkled, smooth, or covered with micaceous scales. They may precede the occurrence of the pigmentation or follow the latter, or may even follow the development of the telangiectases described below. Crocker ascribes to these atrophic areas the production of ectropion, which is a common feature of many cases. Atrophy may result, in addition, from epitheliomatous infiltration of the lids, precisely as in epitheliomatosis of adults.

The telangiectases, which are equally common and characteristic of the disease, may be punctate or stellate; they are usually fine and conspicuous by contrast with the pigmented skin in which they develop, though they may result in minute pinhead-sized tumors of the skin. They may be few or numerous, and are less conspicuous, as a rule, on the surfaces covered with the clothing than elsewhere in the regions exposed to the light.

The new-growths visible in the victims of the disease vary greatly in type, and are epitheliomatous in character, the different clinical features described by observers not suggesting a wider variation than can be determined in any study of the clinical appearances of epithelioma in the skin of persons of advanced years, including those lesions described as verrucous, papillary, discoid, fungating, deep-seated, and rodent ulcer. Warty growths, which may be pea-sized or larger, flattened or pointed, are irregularly disseminated among the lentigines or conspicuously developed at isolated points, such as the back of the hand or on the face in front of one ear. In other cases described, circumscribed epitheliomatous infiltrations not productive of tumors are noted. Such an infiltration on the face may be the cause of ectropion, as above mentioned.

The other symptoms of xeroderma pigmentosum are related more or less closely to the chief lesions described above. There may be open or crusted ulcerations resulting from circumscribed epitheliomatosis. In one of the patients above pictured, a boy four years old, a lesion developed in the tragus of one ear, which might serve as a classical illustration of the "rodent ulcer" of English writers. Healing of such ulcers may result further in deforming cicatrization. Keratitis is exceedingly common, accompanied by profuse semipurulent lachrymation and photophobia of extreme degree in many patients. Corneal opacities sufficient to obstruct vision even in the very young occur to a grave extent. A profuse catarrhal discharge from the nose, with extension of the disease to the Schneiderian membrane and also to the inner faces of the lips and buccal cavity, may result.

The scalp may be free, or the seat of pityriasic scaling or of lentigines. Often, as the disease progresses, a characteristic thinning of the affected integument occurs, producing the so-called "parchment skin."

In very young subjects the partially blind patient has an apathetic expression and listless demeanor, which are highly characteristic. The course of the disease is variable, some of the children dying of marasmus in the course of a few months; others surviving to adult years. J. C. White¹ records the case of a patient the subject of xeroderma pigmentosum who lived for forty-five years. The disease may seem for months at a time to be arrested, after which it may be awakened to activity.

Audry² reports a case in which xeroderma pigmentosum occurred without pigmentation in a male patient, twenty-four years of age, an epithelioma of the lower jaw having developed between the third and fourth year of life. The author, as a consequence, places in the first rank of symptoms of this disease the redness, the vascularization, the atrophy, and the pseudo-ichthyosis of the skin; and calls attention to the fact that all other symptoms may be lacking, the epitheliomatous being only a superadded change. Audry does not hesitate to declare absolutely that on the basis of pathological findings there is no connection—in fact, an absolute distinction—between the cases of xeroderma pigmentosum in childhood and those reported as occurring late in life.

A number of cases of xeroderma pigmentosum have been reported as first occurring in adult years, and even at an advanced age. There is, however, some doubt as to whether those suffering at this age should be included in the class with the childhood cases. Beurmann and Gougerot³ report details of a case of a male patient, sixty-seven years of age, affected with a gastric epithelioma, whose symptoms closely simulated those of xeroderma pigmentosum, viz.: minute multiple angiomas distributed over the exposed parts of the body, with whitish, atrophic points, having a pigmented areola, accompanied by puncta of hyperpigmentation about the head and trunk. Howard Fox records the case of a patient aged twenty-six years, duration of the disease nine years, which could not be classed with the juvenile cases. Corlett would classify the cases in one group. Sequeira⁴ and many others report cases in detail in which the disease has been present since early childhood. The term *senilitas precoc* has been aptly applied to the condition of the young subjects of the disorder. All the changes seen in xeroderma pigmentosum occur not infrequently in senile skins, and the remarkable thing about the disease under consideration is the fact that such changes, including malignant growths, can occur at so early an age as is the case in the major number of instances.

¹ Jour. Cut. Dis., 1912, xxx, p. 291 (discussion of C. J. White's case).

² Annales, 1907, s. iv, viii, pp. 199-204.

³ Ibid., 1906, s. iv, vii, p. 391.

⁴ Brit. Jour. Derm., 1906, xviii, p. 253.

in cases radiotherapy has produced pigmentation, atrophy, and telangiectasis, it would appear on *a priori* grounds an inexpedient method for adoption in these conditions.

Hahn and Weik¹ experimented upon two cases with different forms of light treatment, including Finsen's rays, the Uviol, and the quartz lamp. The results did not appear to be conclusive.

Prophylactic treatment is indicated in the way of prevention of exposure of these patients to the direct rays of the sun; and, as Corlett has so wisely expressed it, particularly against sudden or too protracted exposure in people unprotected by an immunizing coat of tan.

Prognosis.—The outlook in the majority of cases is exceedingly grave, since most of the patients eventually perish from the immediate or remote results of cancerous changes. Two of Crocker's patients lived for nineteen years; one of White's for forty-five or more years; another of Crocker's (a supposed "senile" case) suffered for forty years. Precocity in wart- and tumor-development is said not to indicate special gravity for the future.

CARCINOMA OF THE SKIN.

Carcinoma of the skin may occur as a primary disease arising directly from the epithelial structures; or the disease may originate elsewhere and invade the skin secondarily. The most important of these is epithelioma, which includes rodent ulcer, after which may be named Paget's disease, and lenticular, tuberoso, and melanotic carcinoma.

Carcinoma Lenticulare.—This is rare as a primary cutaneous manifestation, but appears generally secondary to a cancerous involvement of other organs, such as the female breast. It occurs either upon the skin covering a breast which has been previously transformed into a cancerous mass, or as a cutaneous relapsing lesion after extirpation of the latter. The lesions are pea- to bean-sized, densely firm, shining papules and nodules, varying in color; or may be a more or less diffuse infiltration of the skin, of similar characteristic hardness, associated often with hyperemia of a purplish-red shade.

When the cancerous infiltration is widely diffused and densely indurated, involving a large portion of the integument of the thorax, the condition is termed by the French *cancer en cuirasse* (Fig. 154), a title first given by Valpeau. The malady is striking in its peculiarities, and in the highest degree serious. The integument of a large portion of the chest, usually more in front, but also behind, and even a part of the anterior abdominal wall, is converted into a dense, leathery envelope, often so compressing the chest-wall as seriously to impede respiration. A zoster-like arrangement was recorded by Welsh,² and lesions on the lower abdomen and upper thigh by Neu-

¹ Archiv, 1907, lxxxvii, p. 371.

² Brit. Jour. Derm., 1908, xx, p. 271.

PLATE XXII



Clinical View

Basaloid Squamous Carcinoma.

stadt.¹ The edges of the infiltration are poorly defined save at the lines where tongue-like prolongations (*languettes*) of dull-reddish hue indicate the advance of the scirrhus process over the skin. The lymphatic circulation is obstructed, the glands enlarge, and, what is almost pathognomonic of the disorder, the upper extremity, especially the forearm, usually of the side chiefly involved, becomes enormously swollen and edematous. The nipple may or may not be retracted; the breasts, one or both, are firmly bound down to the chest-wall by the cuirass of dense skin, hard, smooth or rough, shining, and either reddened in dull hues or of normal tint, here and there traversed by vessels, and breaking down into ulcerations, usually first

FIG. 154



Cancer en cuirasse, chiefly involving the right side of the chest.

about the nipple, but also elsewhere. The process is one of the more rapid of the scirrhus metamorphoses of the body, as a fatal result is usually reached in a few months, though years have in some cases elapsed before death has resulted. One of Dr. Hyde's patients, an unmarried woman, perished in the course of a few months, the cancer having originated in the skin. Milium-like masses, as large as grains of wheat, undergoing fatty degeneration in the centre and readily expressed like comedones, are occasionally present, and vesicles occurred in the case described by Neustadt. We have had several examples of the disorder under observation. Two were men,² and

¹ Zeitschrift, June, 1912, xix, No. 6, p. 487.

² Hartsell, Jour. Cut. Dis., 1910, xxviii, p. 97 (case, a male, greatly improved with x-rays).

two of the early cases were fully described by Dr. Hyde,¹ in 1892. An instance of widely disseminated lenticular cancer of the skin (illustrated by portrait), described by Morrow,² occurred in a healthy-looking woman as a secondary phenomenon after removal of primary cancer of the breast. A case with extensive involvement was recorded by Pollitzer, in which the skin over the greater part of the trunk, front and back, was red, hardened, dotted over with lichenoid papules and tubercles, and intensely pruritic. Whether the nodules be,

FIG. 155

*Cancer en cuirasse.*

as to cutaneous manifestations, primary or secondary, the symptoms are generally the same. The lesions are closely-set, shining, firm, reddish papules, infiltrations of a dull-reddish hue, miliary and pigmented deposits, tubercles varying in size, subcutaneous nodules, and secondary results in the way of formidable ulcers, crusts, and fungous growths.

¹ Amer. Jour. Med. Sci., ciii, p. 235.

² Jour. Cut. Dis., 1884, ii, p. 1.

Treatment and Prognosis.—The disease is fatal, but much relief from pain, with removal of many lesions, can be had with radiotherapy.

Carcinoma Tuberosum.—This is a rare manifestation of the disease, characterized by larger lesions than those described in the preceding variety. They begin in the deeper portions of the skin and gradually enlarge and extend toward the surface. They may be few or numerous, frequently the latter, and may be discrete or grouped, forming nodular masses. They vary in size from small nodules in the beginning to egg-size or larger later. They are firm, oval or round in contour, and as they increase in size the skin over them becomes tense, reddened, brownish-red or bluish in hue. They occur usually in patients past middle life, and run a course that may be moderate or rapid. Their tendency is to break down into ulcers, which may be foul and fungating, and which gradually or rapidly induce cachexia and a fatal termination. General metastasis, involving the internal organs, may supervene during the course of the disease, with the accompanying symptoms of general carcinosis.

Prognosis and Treatment.—The prognosis and treatment are those outlined in the lenticular variety.

Melanotic or Pigmented Carcinoma.—This is a rare and malignant form, characterized by the presence in the lesions, both primary and secondary, of pigment. The growths usually begin as hemp-seed- to pea-sized, single or numerous, soft or dense nodules, which may develop in time into tumors of considerable size, and which are stained in various shades from a grayish-brown or a slate color to a dead-black, the pigment being occasionally displayed irregularly in streaks or bands over the surface of the growth. They occur over any portion of the surface, often upon the extremities and the genitals, starting frequently from benign pigmentary lesions, such as nevi and moles. Anatomically, the pigment is found to be deposited both between the cells and in the protoplasm of the cells themselves.

In a few instances, the disease is limited to single melanotic growths of this character. The cancer is apt to develop into the papillary form, furnishing thus fungoid vegetations, which have a noteworthy tendency to degenerate into ulcers. Often such verrucous masses are seen surrounded by grayish or blackish papules, or by a diffuse cancerous infiltration of the integument; they also exhibit irregular pigmentation of the surface. The disease often appears in the viscera, in the form of disseminated cancerous nodules, each highly vascular, and exhibiting in varying quantity granules of pigment. The growth has usually a relatively rapid course and malignant career.

Recent investigations (*Cf.* Melanotic Sarcoma) indicate that the majority, if not all, of the malignant pigmented growths which spring from moles and nevi, and which in the past have been considered to be sarcomatous, are, in fact, pigmented carcinoma.

A melanotic rodent ulcer, a superficial melanoepithelioma, and an infiltrating melanoepithelioma have been described by Johnston.¹

¹ Jour. Cut. Dis., 1905, xxiii, p. 64.

Prognosis and Treatment.—In the majority of cases the disorder terminates fatally. Early and thorough excision of the beginning lesion is all that can be recommended.

Paget's Disease.¹—**Synonyms:** Eczematous Epitheliomatosis of the Nipple, Malignant Papillary Dermatitis, Cutaneous Psorospermiosis.

This disease was first described in 1874 by Paget,² and has since attracted the special attention of a number of English, French, and American observers, including Thin, Duhring, Malassez, Darier, Wickham, Jackson,³ and others.

At the onset, the condition suggests an eczematous involvement of the areola of the nipple, usually of one breast only, in women between forty and sixty years of age. The process begins with a moderate inflammation, exhibited as redness and scaling, involving the nipple and areola. Later the surface is intensely red and granulating, exuding copiously a clear, viscid secretion, and producing subjective sensations of heat and burning, with intense or with moderate itching. The definition is distinct, the tissue is indurated, and the tenderness and pain are usually well marked and distressing. A conspicuous feature of the disease is the circumscribed infiltration of the skin and subcutaneous tissue, which on palpation suggests a large-sized coin or button let into the substance of the areola and surrounding parts.

When the disease has progressed to this point a cancerous infiltration of the breast is usually recognized, at least after its removal, for even with great care it may not always be possible to distinguish it before ablation of the gland. Crocker, however, held to the belief that the disease of the nipple may endure for years without resulting retraction and development of scirrhous of the breast. The French recognize three stages: those in which the disease is limited, respectively, to the nipple, the areola, and the breast, the latter, of course, succeeding but not replacing the earlier. In all cases there is no attempt at repair; and when abandoned to its course the ultimate result, after five or eight or more years, is a profound ulceration, with destructive effects most noticeable in the region of primary invasion, the entire breast having become cancerous.

Cases of Paget's disease affecting other parts of the body have been recorded by a number of observers, including Fordyce, Fox and MacLeod, Hartzell,⁴ and others. The disease has been seen by the various observers on the scrotum, the penis, the buttocks, the vulva and perineum, in the pubic region, about the umbilicus, in the axilla, on the arms, neck, lips, and nose. In three cases treated by the author the lesions were situated, in the first, over the back, a large area

¹ For bibliography, see Matzenauer, Monatshefte, 1902, xxxv, p. 205.

² St. Bartholomew's Hosp. Reports 1874, p. 87. See also the paragraphs in this treatise devoted to this subject under the title of Eczema.

³ Jour. Cut. Dis., 1896, xiv, p. 428; *ibid.*, 1903, xxi, p. 201.

⁴ Jour. Cut. Dis., 1910, xxviii, p. 379 (Extra-mammary Paget's disease, with report of a case occurring on the forearm, associated with melanocarcinoma; with analysis of 18 cases in the literature).

occupying a region over the sacrum; in the second, a palm-sized area situated on the left arm; and in the third (case demonstration American Dermatological Association, 1914) numerous areas from dime- to saucer-sized occurred on the back and sides of the trunk and over the abdomen.

Etiology.—The disease has been noted usually in women past forty years of age. It commonly attacks only one breast, the right being more frequently involved. No definite cause has been discovered. Darier discovered the peculiar cells described below, and, thinking they were coccidia, ascribed the disease to their presence. His findings were later confirmed by Wickham, but at the present time all observers agree that these are cell-degenerations and not microorganisms. A

FIG. 156



Paget's disease of the breast.

fungus was isolated by Fabry and Trautmann,¹ which, however, is believed to have been a contamination. The connection between the malignant growth of the breast and the non-malignant dermatitis which precedes it is not settled. The inflammatory process is considered by most observers to be benign, but of the nature of a pre-cancerous condition.

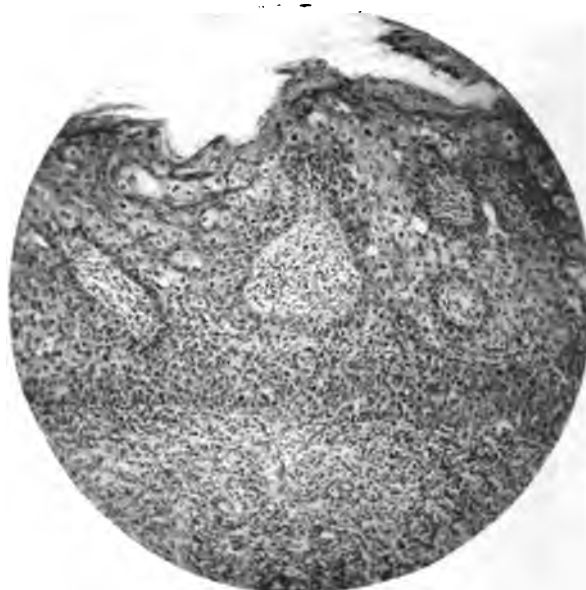
Pathology.—The pathology of the disease in the mammary region has been studied by Butlin, Unna, and others,² and in the extra-

¹ Archiv, 1904, lxi, p. 37.

² Unna, Histopathology, p. 737 (an independent description of the pathology of the disease, with review of the work of Butlin, Thin, Duhring and Wile, Darier, Wickham, Hutchinson, Jr., and others).

mammary regions by Fordyce,¹ Fox and MacLeod,² Hartzell, and others. The characteristic histologic changes consist in an epidermal edema; an hypertrophy, in which peculiar cells are found; and a cellular infiltration in the corium of a granulomatous character. In the epidermis there is edema, producing enlargement and other changes in the epithelial cells; also hypertrophy, producing a thickening of various grades; and a down-growth of the rete pegs into the corium. Occurring in varying numbers, double-contoured cells of unusual size, having deeply staining reactions and showing changes

FIG. 157



Paget's disease of the buttock, showing the changes which take place in the epidermic cells. They are very much swollen from edema, vacuolated, and have their nuclei pushed to one side. Many of them have lost their prickles. In the corium there is a dense infiltration of lymphocytes and plasma-cells. (Fordyce.)

in the nucleus as to form, size, and location, with retraction of the protoplasm, are present. These cells may be round or irregular in shape, frequently contain nuclei, and resemble the coccidia or psorosperms, which they were formerly considered to be by Darier, whose work was confirmed by Wickham. All observers now agree that they are cellular degenerations. In the corium there is found a dense cellular infiltration. This usually begins around dilated blood-vessels, and occurs as collections of cells, as well as in diffuse areas. It is composed of leukocytes, small connective-tissue cells, and plasma-cells, and in the area of infiltration the collagen and elastin are more or less destroyed. The retraction of the nipple is due to a sclerosis

¹ Jour. Cut. Dis., 1905, xxiii, p. 193.

² Brit. Jour. Derm., 1904, xvi, p. 41.

occurring around the mammary ducts, the latter being involved in malignant infiltration very early in the process in certain cases. The subsequent carcinoma may develop either from these ducts, the glands beneath, or from the under surface of the epithelium.

The histology of the extra-mammary cases corresponds to the above in most particulars. In some cases the cellular exudate in the corium is less marked. The presence of the Paget cell and other characteristics identify the condition histologically.

Treatment.—In the breast cases operative procedure is indicated. If for any reason this cannot be done, x-rays may be employed. In four cases treated by us, three have remained well; in the fourth a carcinoma of the breast developed four years later. The local treatment ordinarily suggested for eczema has no effect on the inflammatory process occurring in this condition. In the extra-mammary cases it is agreed by most observers that x-rays or radium give best results.

Epithelioma.—**Synonyms:** Epithelial Cancer, Skin Cancer, Rodent Ulcer, Carcinoma Epitheliale. Ger., Epithelialkrebs; Fr., Cancroïde.

Definition.—Epithelioma is a destructive new-growth arising directly from the epithelial structures of the skin.

Symptomatology.—*Superficial or Discoid Epithelioma* usually is displayed first upon the sound skin in the form of one or of several pinhead-sized papules, flat infiltration disks, or nodosities of a dull-yellowish, reddish, grayish, or dirty, wax-like hue. The growth may also have its origin in previously existing skin-lesions, which are both numerous and different from one another. Among the latter may be named: fissures and excoriations (especially those long teased by caustic applications), warts, nevi, acneiform and molluscoid lesions; and the dry or greasy epidermal scales often seen at the orifices of sebaceous glands in the faces of the aged. The outline of the newly developed growth, as a consequence, varies, being roundish, linear, or irregular. As a result of accident or traumatism (especially scratching and picking, which the history of a large proportion of all cases includes), there forms a superficial excoriation, which may be covered with a sero-sanguineous crust after the desiccation of its scanty and ichorous secretion. In the progress of its development it is often noticed that new foci of disease appear in the immediate vicinity of the first, represented by subepidermic indurated nodules, or superficial "pearls," resembling milia, whitish and lustrous, with marked tendency to vascularization, exfoliation, and superficial ulceration.

The subsequent course of the lesion varies, its evolution being generally slow and accomplished only in years. Sometimes having attained a maximum of size, the ulcer, if unmolested, long persists without appreciable change. In other cases the base cicatrizes and the epithelioma completely exfoliates, leaving an outlying linear ulceration, which may persist or spread. In yet other cases, after a persistence of from ten to twenty years, the ulcer may spontaneously close and the disease be at an end. Sometimes the ulceration is very superficial

and slowly spreads in circles, segments of circles, or in irregular gyrate outlines, the older portions healing and cicatrizing while the border advances. Such lesions may cover considerable areas of the body and closely resemble the serpiginous lesions of syphilis and lupus. In many cases the papillomatous element is marked. Finally, any one of the destructive and malignant cancerous processes may be awakened, and the epithelioma be thus transformed from the type of the superficial to that of the deep variety of the disease.

FIG. 158



Epithelioma.

A peculiar flat, superficial, morphea-like, epitheliomatous growth, with a tendency to undergo ulceration, has been described by Danlos,¹ Stelwagon,² Crocker,³ Fordyce,⁴ Hartzell,⁵ Heidingsfeld,⁶ and others. The lesions have a varying outline, are slightly depressed, of a yellowish-white color, have associated telangiectatic vessels over their surface, and sooner or later exhibit ulceration.

¹ *Annales*, 1899, x, p. 656.

² *Trans. Amer. Derm. Assoc.*, 1899, p. 166.

³ P. 1012.

⁴ *Jour. Amer. Med. Assoc.*, October 24, 1908, p. 1398.

⁵ *Trans. Amer. Med. Assoc., Sec. on Derm.*, 1909, p. 25; *Jour. Amer. Med. Assoc.*, 1909, liii, p. 262.

⁶ *Jour. Amer. Med. Assoc.* 1912, lix, p. 256.

*Rodent Ulcer*¹ (*Jacob's Ulcer*; *Ulcus Exedens*; *Noli-Me-Tangere*; *Cancroid Ulcer*).—This form of epithelioma begins as a small, insig-

FIG. 159



Epithelioma of the cheek.

FIG. 160



Rodent ulcer. (Fordyce.)

¹ For full discussion of this type of epithelioma, see Dubreuilh et Auché, *Annales*, 1901, s. iv, ii, pp. 705-780 (seventeen figures; bibliography).

nificant, scale-covered excoriation, or as a brownish-red or ivory-yellow, smooth, firm, hard elevation, usually with dilated vessels on its surface. It may remain in this stage

FIG. 161



Epithelioma of the ear.

for years, or gradually enlarge and finally ulcerate superficially and become crust-covered. The crust falls and a new one forms, each subsequent onset covering a larger ulcer. The ulcer is roundish, fissured, or slightly angular in contour, and has a reddish or reddish-brown, irregular, granulating, and mammillated floor, covered with a thin, translucent, viscid serum, which, in drying, suggests the effects of a varnish over the part. The edges of the ulcer are clean cut, indurated, everted, usually well attached, and, seen in horizontal profile, irregularly indented. The symptoms are slight at first; the lymphatic ganglia and general health being unimpaired. The site of

election is the face, particularly the eyelids, nose, temples, and occasionally the lips;¹ though the genitalia, the hands, and the feet may be affected. Of two hundred and fifty

FIG. 162



Carcinoma of lip.

cases collated by Heurtaux, in one hundred and ninety the face was attacked.

¹ Pusey, Jour. Cut. Dis., 1913, xxxi, p. 73 (review of rodent ulcer of lip).

Some English writers describe rodent ulcer as distinct from epithelioma, chiefly by reason of its individual peculiarities. The clinical features upon which this distinction is based are: the slow or intermittent development of rodent ulcer; its tendency to destroy, as it extends, all the tissues within reach; its failure to implicate the system by secondary deposits or metastases; its rounded and often widely everted edges, or, better, lip, often distinctly vascularized; its gouged floor, exhibiting unequal levels; its slight tendency to granulation; its feeble or negative attempts at repair; and, above all, its pearly-gray, somewhat fluted border. The importance of the last-mentioned finding cannot be over-estimated in the differentiation from lupus, syphilis, and from other forms of skin-cancer. Pathologically, this firm, pearly border represents the strong connective-tissue barrier upon the resistance of which depends the relatively mild course of

FIG. 163



Epithelioma. (Howard Morrow.)

rodent ulcer. All these symptoms are those of epithelioma, if one chooses to employ the term in its large and proper sense. The rounded or oval excavation, often exceedingly clean cut, at times with a corded and whitish rim, producing little if any pain, is characteristic of the rodent ulcer, yet in its extension it may exhibit all the symptoms of a deep epithelioma.

A special type of this variety was described by Hutchinson under the title *Crateriform Ulcer*, distinguished chiefly by rapidity of invasion. Its onset is by the formation of a roundish or conical mass, which rapidly exhibits ulceration, a central crater forming with exceedingly dense walls.

Deep or Tubercular Epithelioma.—This variety may originate in the manner already described, or may be from the first characterized by its specific features. It commonly begins by the formation of roundish, very firm, pea-sized nodosities, closely set in the skin and

subcutaneous connective tissue; or it may be thus situated and well projected from the surrounding surface. In the course of months or years these nodules develop to form a nut- or even a small-egg-sized tumor, roundish, dark-reddish in color, and delicately vascular on its surface. This tumor may be a deep, flattish, or globoid development within the skin; or be a well-developed nodule attached to it; or (and this is a common form) be a dense, thick, flattened plaque, a centimeter or more in diameter, its walls steeply descending to the sound skin on either hand or moderately everted; its centre depressed by atrophic changes; its surface shining, waxy, pinkish or red, with ramifying capillaries. "Satellites" may form in its vicinity.

Degeneration of these forms produces in the course of time an ulcer either like that described above, or one which deeply and destructively encroaches upon the tissues beneath. In advanced cases

FIG. 164



Deep nodular epithelioma. (Howard Morrow.)

the ulcer is irregular in contour, with a clean-cut, everted, indurated lip; eroded and "gouged," hemorrhagic and granulating floor; thin, viscid secretion, which is foul and purulent at times, when the resulting destruction is rapidly accomplished; and a deeply attached base, which may be perforated by a crateriform exulceration, extending down to or through muscles, fasciæ, cartilage, and bone. The lymphatic ganglia become simultaneously involved, and a general cachectic condition is established. Death may ensue from marasmus, exhaustion, or hemorrhage in the course of several months or from one to three years.

Papillary Epithelioma.—The cancer in this variety assumes the form of a malignant papilloma. In these cases a pedunculated or sessile, narrow- or broad-based, smooth-capped or spongy and verrucous vegetation is attached to the skin upon which it forms. It

may originally be as small as a pea, but usually it increases considerably in volume, being not rarely pigeon's-egg- and turkey's-egg-sized. The surface is either dry, reddish-yellow, smooth, and lustrous, exfoliating, and secreting an offensive-smelling, sanguineous or translucent fluid; or it is moist, granulating, filamentous, and intermingled with hairs, as when it occurs upon the bearded cheek. Degeneration occurs later, fissures forming first; subsequently there appear superficial and finally deep ulcers, which ultimately assume all the features of the epithelioma described above.

In some cases the epithelioma forms a soft, hemispherical, small-nut- to egg-sized tumor, which upon pressure discharges numerous convoluted plugs, composed of epithelium, fatty masses, and a puru-

FIG. 165



Epithelioma of the forehead. (Douglass
W. Montgomery.)

FIG. 166



Epithelioma.

lent secretion. The bases of these soft masses are remarkable for the ease with which they can be curetted and thus radically removed.

A careful study of well-marked cases of papillary epithelioma indicates clearly that, while ulceration often results, the centre of the mass breaking down and furnishing a typical cancerous excavation, with hard and rounded or oval border, uneven base, irregular, granulating floor, and offensive discharge, the picture may be wholly different. Occasionally, the superficial process extends widely over the brows, cheeks, and chin, interspersed with raised cicatriform areas, suggesting that ineffectual attempts had been made to check the disease by surgical measures. These apparently atrophic disks, mingled with vascular, florid, fungiform, pyriform, and oddly shaped outgrowths, are really cancerous infiltrations of the type of discoid

FIG. 167



Multiple carcinomata, with diffuse precancerous hyperkeratosis.

FIG. 168



Section from a small tumor from the same patient.

epithelioma. They may be seen gluing the lobe of the ear to the cheek, or everting the lower eyelid, even when superficial papillary vegetations are predominant features of the disease.

Endothelioma of the skin has been recorded in a few instances.¹ In the three cases reported by Spiegler² and in three others collected by him from the literature, numerous tumors, varying in size from that of a pin's head to an orange, were located on the scalp. In some cases pea-sized tumors were seen also upon the face, neck, back, and chest. The course of the growth is comparatively benign. The histological structure of these growths is that of a small-cell epithelioma, the origin being traced originally to the endothelium about the blood-vessels. Dubreuilh and Auché³ demonstrated these growths to be benign epitheliomata, derived from the basal layer of the epidermis, and closely resembling histologically rodent ulcer. Fordyce⁴ recorded a case in which a pea-sized tumor formed at the border of a lupus scar on the forearm, which was considered at the time to be an endothelioma; but further study of the sections convinced him⁵ that it was a basal-cell tumor with cystic degeneration.

Features of the Clinical Forms.—Epithelioma of the skin occurs also with multiform features, almost as numerous as the several different lesions from which a cutaneous cancer may take its origin.⁶ Thus, a wart, a "button," a vegetation, a crack, an erosion may result in a fissure that bleeds easily and refuses to heal. After months or years there forms an epithelioma assignable to one of the clinical varieties described above. In other cases there may be a number of greasy scales upon the skin-surface, resembling those seen in well-marked seborrhea sicca; and in one or two spots the removal of these scales offers to the eye a superficial erosion implicating the derma, bleeding freely, and, when undisturbed, crusting and slowly spreading under the crust rather than healing. In yet other cases a thin pellicle of apparently loosened epithelium, looking like a papery crust, is found, when removed, to cover three or more shallow ulcers, unexpected and hidden from view by the tenacious pellicle which had protected them and beneath which they had indolently and painlessly developed.

Three varieties or types of epithelioma may coexist in different portions of the same integument, or the one may develop from the other, a malignant papillary growth springing from a superficial or a deep cancerous infiltration. Familiar examples of the disease are seen upon the eyelids and contiguous portions of the nose; the cheek and the lower eyelid, the latter being often drawn into ectropion by a cicatriform bridle or band; the nose or lip and adjacent mucous or osseous tissue; and the glans and prepuce, where the vegetating forms are of more frequent occurrence. The vast destruction wrought

¹ For bibliography, see Waldhein, *Archiv*, 1902, lx, p. 225.

² *Archiv*, 1899, i, p. 163.

³ *Annales*, 1902, p. 545, quoted by Adamson.

⁴ *Amer. Jour. Med. Sci.*, 1900, cxx, p. 159.

⁵ *Trans. Amer. Med. Assoc., Cutaneous Sec.*, 1908, p. 120.

⁶ Fordyce: "Clinical and Pathological Observations on Some Early Forms of Epithelioma of the Skin." *New York Med. Jour.*, June 9 and 23, 1900.

by the widest development, and consequent degeneration, of epithelioma is sufficiently recorded in the annals of both medicine and surgery.

Regional Epitheliomata.—*Cancer of the Head* is recognized as constituting nearly three-fourths of all cancers of the skin. Upon the brow, the alæ of the nose, the temples, cheeks, chin, scalp, or other part, the disease may begin either upon or beneath entirely normal skin, or in that which has pathologically been changed. The origin of the disease is usually ascribed, in an old man, to the picking, scratching, or shaving of a sebaceous wart; or in similar traumatisms of acnei-

FIG. 169



Carcinoma of the ear.

form, seborrhoic, or furuncular lesions in either sex. In other cases, the dermatologist, consulted with reference to some other ailment of the skin, can recognize, in persons of the age most liable to such accidents, one or several pinhead-sized or larger, milium-like nodules clustered about the temples or the nose, that indicate the site of the awakened epitheliomatous change. The disease progresses slowly, spreading superficially along the alæ of the nose in irregular lines; in more complete centrifugal outline over the temple and brow; almost symmetrically over the tip of the nose, and with odd indentations of contour in the dense integument immediately in front of the

tragus of the ear. The vegetating forms are more common on the brow, scalp, and chin; the "rodent-ulcer" type over the temples and cheeks. The more superficial varieties in any part of the face may be slowly converted into the deeper. The flattened, egg-sized disks of infiltration are more common on the cheeks and chin.

The devastation produced by malignant cancer is nowhere more conspicuous than in the face. Cartilage, bone, muscle, and entire organs melt before its ravages with astounding readiness. Within a period of two years, a circumscribed, flat, epitheliomatous infiltration, limited for many months to one cheek, may spread to the point of destroying the ear, eye, and inferior maxilla of one side of the face, opening into the larynx and esophagus, and not produce a

FIG. 170



Carcinoma of the lip.

fatal result until the jugular vein of the same side is opened by ulceration (Hyde).

Cancer of the Lower Lip, far more common in men than in women,¹ on account of exposure and the tobacco habits of the former, may arise either as a minute lobule or as a circumscribed thickening on or near the vermilion border, usually of one side; or as a linear, narrow, and shallow excoriation, often protected by a thin crust, extending well along the mucous edge of the lower lip that is in contact with the upper when the two are lightly approximated. Later

¹ Wise, New York Med. Jour., September 27, 1913 (Epithelioma of the lower lip in a woman; pertinent bibliography).

the lip may be the seat of a defined tumor, small-nut- to egg-sized, that may deeply involve its entire thickness, encroach upon the chin, loosen the teeth, destroy the gums, larynx, pharynx, tongue, and maxilla, and eventually produce one of the formidable and remediless chasms of the lower part of the face already described. The upper lip is rarely involved, but Hazen¹ reports a unique case of epithelioma of the upper lip in a full-blooded negro.

Cancer of the Genital Organs is submitted to the surgeon more frequently than to the dermatologist. The glans penis, the clitoris, and the prepuce are occasionally the seat of a warty variety; but the scrotum, labia, thighs, mons veneris, and abdominal walls, as well

FIG. 171



Carcinoma and precancerous keratoses.

as the parts first named, may be involved in the superficial or the deep form of cancer. In persons of cleanly habits, the superficial variety of epithelioma may persist in the genital region as indolent and innocuous as upon the face; but where filth is permitted to accumulate about the part (lochial, menstrual, and catarrhal secretions; pus, urine, and feces), the spread may be relatively rapid. The ulcer is then deep, seated upon an indurated and very tender base, and has the steep, punched edge and hemorrhagic floor of the rodent ulcer. Ulceration may later open the rectum, vagina, corpora caver-

¹ Jour. Cut. Dis., 1911, xxix, p. 321.

nosa, perineum, and deep perineal fascia, resulting in vast destruction, which proves fatal by exhaustion of the forces of the patient.

Cancer of the Extremities, particularly of the back of the hand, is at first usually papillomatous, or of the flat, superficial form. It may appear upon the left hand of right-handed patients. An unusual case was recorded by Howard Fox¹ occurring in the hand following a horse-bite. This exhibited a serpiginous, ulcerating, crusting surface, and terminated fatally with metastases. A form of peculiar interest to the dermatologist is that which is prone to develop upon the hand of the x-ray operator. A number of cases due to the persistent action of the Röntgen ray upon the unprotected hand have been reported in recent years. In this site the progress is indolent, and when properly treated is much less liable to grave ulceration than epitheliomata in other situations. In special regions, particularly on the lower

FIG. 172



Carcinoma following injury, resembling blastomycosis. (Prickle-cell type.)

extremities, where the force of gravity generally aggravates any ulcerative process, there may result caries, necrosis, fistulae, and loss of phalanges.

Cancer of the Mucous Surfaces may be primary or secondary in origin. The mucous lining of the oral and nasal cavities, of the vagina, the rectum, and the balano-preputial sac may thus be involved, either by extension of the disease from the neighboring cutaneous surface or by primary involvement of the mucous tissue. The most important, by reason of statistical frequency, is cancer of the tongue and buccal membrane, often having its origin in the leucoplasic striations, plaques, or thickenings known as "smokers' patches," ichthyosis linguae, and psoriasis linguae, an etiological factor strongly emphasized by von Bergmann. A pinhead- to pea- or bean-sized,

¹ Jour. Cut. Dis., 1914, xxxii, p. 50. Ibid., 1915, xxxiii, p. 22.

superficial excoriation is usually the first lesion to which attention is attracted, reddish in color, granulating, tender, and not often very painful; or the beginning is a shallow fissure at the edge or on the tip of the tongue or on the mucous face of the lower lip, its long axis commonly at right angles to that of the organ upon which it forms. Beneath, with more or less rapidity (as a rule slowly), dense induration occurs, lancinating pains dart from the affected region toward the ear or along the jaw; the submaxillary and other glands become tumid and tender, deglutition is painful, and in severe cases well-nigh impossible; or from the nasal membrane the disease extends towards the palate, pharynx, or larynx, and, when ulceration occurs, opens up a vast chasm, which represents all these cavities. In the vagina and the rectum a cancerous change may begin with merely a thickening of the surface of the mucous membrane, leading in the course of time to a superficial, and later to a deep, ulcerative process; or, as in cutaneous epithelioma, the papillary form may be represented in vegetations, cauliflower-shaped, filiform, or simply warty and mammillated, that eventually degenerate and furnish the most formidable of destructive results.

Etiology.—The essential cause of carcinoma is unknown; many factors enter as predisposing or contributing causes. Among these, trauma, both mechanical and chemical, is important. Any long-continued irritation may lead to epithelioma. This is illustrated in the case of the pipe-smoker, the tobacco-chewer, the worker in tar¹ and paraffin, the chimney-sweep, the sailor exposed to the sun and wind, and occasionally the Röntgen-ray operator. Of 1189 cases of epithelioma occurring in the Kashmir Mission Hospital, reported by Neve,² 848 were of the thighs or abdomen, and resulted from friction by the kangri, a portable fire-box used by the natives.

Warts and nevi, when irritated or otherwise, may undergo epitheliomatous transformation. Numbers of cases have been recorded of epithelioma following lupus vulgaris. Sequeira³ found epithelioma as a sequence in lupus vulgaris in 1.5 per cent. of 964 cases. Epithelioma developed in 10 men out of a total of 287, or 2.87 per cent.; while in women only 4 developed this complication out of a total of 677, a percentage of .59 per cent. The average duration of the lupus before the development of the epithelioma was thirty-five years. The lesions were situated chiefly on the cheeks and the neck. In clinical type, eight were nodular and six ulcerative, and histologically they were all squamous-celled, with characteristic nests. Others recording examples of epitheliomata following lupus vulgaris are Barges,⁴ and Adamson.⁵

¹ Zweig, *Zeitschrift*, 1909, xvi, p. 85; abstr. *Brit. Jour. Derm.*, 1909, xxi, p. 190 (Trade cancers: report of two cases in workers in coal tar; began as warts on the face and scrotum). Schamberg, *Jour. Cut. Dis.*, 1910, xxviii, p. 644 (Cancer in tar-workers, with good bibliography).

² *Brit. Med. Jour.*, September, 1910.

³ *Brit. Jour. Derm.*, 1908, xx, p. 40 (with references).

⁴ *Annales*, January, 1910, p. 3 (reporting six cases and analyzing the literature of 164 others).

⁵ *Brit. Jour. Derm.*, 1911, xxiii, p. 246.

Epithelioma occurring with lupus erythematosus is reported by Pollitzer,¹ Reyn,² and several others; as occurring in psoriasis by Hartzell,³ Whitfield,⁴ Fordyce,⁵ Gray,⁶ and others.

The disease not infrequently develops also in the scars of syphilis and those of severe burns. Senile keratoma, which is frequently encountered in persons exposed to the weather, is the most common type of the precancerous disease, and is usually the origin of mul-

FIG. 173



Carcinoma developing upon lupus vulgaris.

tiple epitheliomata of the hands and face.⁷ Arsenical hyperkeratoses occasionally are followed by epitheliomatous transformations, such cases

¹ Jour. Cut. Dis., 1910, xxviii, p. 140.

² Nord. Med. Arkiv., 1911, abt. ii, p. 49; abstr. Brit. Jour. Derm., 1912, xxiv, p. 375.

³ Trans. Amer. Derm. Assoc., 1899, p. 11 (a series of cases).

⁴ Brit. Jour. Derm., 1906, xviii, p. 40 (Rodent ulcer in a patch of psoriasis).

⁵ Loc cit.

⁶ Brit. Jour. Derm., 1912, xxiv, p. 325 (Rodent ulcer on a patch of psoriasis in the gluteal region).

⁷ Bowen, Jour. Cut. Dis., 1912, xxx, p. 241 (Precancerous dermatoses, a study of two unusual cases). Sutton, Jour. Amer. Med. Assoc., 1915, lxiv, p. 403 (The Symptomatology and Treatment of Seborrheic Keratosis).

having been recorded by Hartzell,¹ Schamberg,² and Weidenfeld.³ Several such cases have been observed by the author. In one there were present more than a dozen superficial and more deeply situated epitheliomatous ulcerations, with hundreds of hyperkeratotic and hyperpigmented areas. The patient had been taking arsenic for twenty years. In another case, palmar and plantar hyperkeratoses, with individual hyperkeratotic areas on the fingers and dorsal surfaces of the hands, scrotum, and other areas, were present. From time to time epitheliomatous growths, which were excised and their nature demonstrated, continued to develop on the hands, limbs, and scrotum.

Heredity as an etiological factor is receiving more attention through the experimental work being done with mouse-tumors. Loeb,⁴ and others have shown that not only are there strains of mice peculiarly susceptible to inoculation with a given tumor, but also there are strains from 30 to 50 per cent. of the offspring of which develop spontaneous tumors. Warthin,⁵ in an analysis of 1600 cases, found facts pointing to the importance of hereditary influence. Poll⁶ also found earlier development and greater malignancy in children of cancerous parents.

The disease is one of advanced years, the average age at onset being about fifty-two. It is a pathological curiosity in childhood, but Kaposi has reported a case occurring in the tenth year. Sequeira⁷ recorded the case of a boy aged twelve with a rodent ulcer on the back, and quotes two others, one aged twelve and one aged fifteen, also seen by him. Adamson⁸ reports an epithelioma occurring in the scar of lupus in a girl aged thirteen. Only about 30 per cent. of all cutaneous cases occur in women, which is possibly due to the fact that women are less exposed to the action of irritants. The disease is more common among northern people than among those of the tropics. It is relatively rare in the black races. Hazen⁹ reported the case of a negro suffering with epithelioma of the lip. The principal cause of this immunity, as maintained by Hyde and others, is the protection afforded by the pigment in the colored skin. Brault,¹⁰ however, observed 28 cases among the natives of Algiers during eight years. He thinks this large number argues against the older opinion in regard to the rarity of the disease in hot countries. The occurrence of cancer in those exposed to the sun's rays without proper protection has been emphasized by Hyde,¹¹ Dubreuilh,¹² and Corlett.¹³

¹ Amer. Jour. Med. Sci., 1899, cxviii, p. 265. ² Jour. Cut. Dis., 1909, xxvii, p. 134.

³ Archiv., 1913, cxi, p. 467 (about seventy tumors were present in this case).

⁴ Zeitschr. f. Bakt., 1912, lxvii, p. 133.

⁵ Archives of Internal Med., November, 1912.

⁶ Jour. Amer. Med. Assoc., 1912, p. 557.

⁷ Brit. Jour. Derm., 1912, xxiv, p. 391.

⁸ Royal Soc. of Med., 1911.

⁹ Jour. Cut. Dis., 1911, xxix, p. 321.

¹⁰ Prov. Med., 1912; abstr. Derm. Wochenschr., liv, p. 740.

¹¹ Amer. Jour. Med. Sci., 1906, cxxxi, p. 1.

¹² Annales, 1907, viii, p. 387; abstr. Brit. Jour. Derm., 1908, xx, p. 62 (Epitheliomatosis of solar origin).

¹³ Jour. Cut. Dis., March, 1915, xxxiii (Xeroderma pigmentosum following severe exposure, with report of two cases. Paper read before Thirty-eighth Annual Meeting of the Amer. Derm. Assoc., May, 1914).

A review of the above facts indicates that no single causative factor could account for the development of all epitheliomas, a view held by most investigators. None of the various theories concerning cell-inclusions, parasitic disturbance, and the proper relation of growth and functional activity, nor the congenital tendency of cells, is sufficient. The search for a universal parasite has been practically abandoned; but that there may be some specific organisms in certain types of the disorder is not impossible. That there is an antagonism existing between malignant neoplasms and intercurrent infections, particularly erysipelas, was observed some time ago. Schmidt,¹ in an analysis of 241 cases of cancer, found that 99 of these had never suffered from any infectious disease.

FIG. 174



A cancer of the leg, of the prickle- or squamous-cell type. Photograph shows cross sections of epithelial processes which have a concentric arrangement, their centres undergoing pearl-formation. (Fordyce.)

Pathology.²—Cutaneous carcinomata may, in a general way, be divided into two classes: first, those which have their origin in prickle-cells, which are termed prickle-cell epitheliomata, and are represented clinically by the cases which occur following trauma and other outside irritations, which would include cases of the disease occurring among workers in paraffin and tar, the "chimney-sweep cancer," those developing on senile warts, the "sailor's skin," and those developing

¹ Med. Klin., 1910, vi, p. 43.

² MacLeod, p. 115. Fordyce, Trans. Amer. Med. Assoc., Sec. on Derm., 1908, p. 120; *ibid.*, 1910, p. 119.

in connection with lupus vulgaris and lupus erythematosus; and, second, the basal-cell group, which has its classical representative in rodent ulcer. In the first group, the cells of the tumors retain their prickles, and they are more malignant, producing early destruction and frequently general metastasis. In the second group, the tumors are made up of small cells without prickles and contain relatively large nuclei. There is no tendency for these to generalize. In the prickle-cell or squamous-cell growths, solid prolongations extend downward from the epidermis, which spread out in various directions and are surrounded by connective-tissue fibers and bundles, which on

FIG. 175



Cylindroma.

An epithelioma of the basal-cell type removed from the face. Hyalin degeneration of the interior of the tumor has resulted in the lace-like appearance. The tumor cells are small, with chromatic nuclei and very little protoplasm. The connective tissue shows an inflammatory reaction. (Fordyce.)

cross-section give an alveolar appearance. In this variety individual epithelial cells become cornified, and in all nests occur. These are produced by a process of cornification similar to that occurring normally in the epidermis above. In the centre of such a nest some hyalin-degenerated cells occur, with cellular débris, around which are concentric rings of cornified cells. Outside of these uncornified cells and surrounding all, the basal layer is not infrequently demonstrable. The cells in this variety retain their prickles, and the origin is from the rete Malpighii above the basal layer.

In the basal-cell variety, the tumor rises from some part of the

basal layer of the epidermis, or from similar cells of the hair-follicles. The epidermis grows downward in cylindrical processes, which increase in size and by coalescence produce a diffuse infiltration of cells, or by passing along the lymphatic spaces produce a network. Occasionally, the processes become clubbed at the ends and sometimes produce acini. The cylindrical processes and acini are early limited by a regular layer of cells like those in the basal layer of the epidermis. Later this is lost and an irregular infiltration occurs. The cells lose their prickles and have a relatively large, deep-staining nucleus, are surrounded by a small amount of protoplasm, and are oval or roundish

FIG. 176



Cylindroma of the scalp.

The cells of this tumor are small and closely resemble those of the basal layer of the epidermis. Inside the cellular aggregations hyaline degeneration has taken place in the form of small cylindrical areas, from which the growth derives its name. Immediately surrounding the cell-masses the connective tissue has likewise undergone degeneration, appearing as a narrow, homogeneous band of hyaline. (Fordyce.)

in shape. Numerous mitotic figures may be detected, and cystic degeneration producing cavities in the masses is not uncommon. Occasionally, this is sufficiently prominent to produce clinical manifestations.¹ The tendency of this variety is for lateral rather than downward progress, and as there is a more or less complete limiting layer of cells this type is less malignant. Adamson² believes that these growths belong to the class of nevroid growths which includes adenoma sebaceum and multiple benign cystic epithelioma.

¹ MacLeod, Brit. Jour. Derm., 1909, *xxi*, p. 349.

² Lancet, London, March 21, 1914, *clxxxvi*, p. 810.

Diagnosis.—The diagnosis presents, as a rule, no difficulties. In those forms which are secondary the recognition of the primary tumor is conclusive.

In the primary forms, the etiologic factors must constantly be borne in mind. The history of the case and the patient's age are primarily important. Thus, in a middle-aged man accustomed to the use of the pipe, a refractory ulcer on the lip must be looked upon as cancerous until the weight of evidence can be shown against this diagnosis. Rodent ulcer, in particular, in its manifold early varieties, is apt to remain long unrecognized as cancerous.

Rodent ulcer has a benign course; is commonly found on the eyelids, nose, temples, and lips; does not give rise to metastases, though Fordyce¹ mentions a case with regional involvement; and, above all, has the unmistakable pearly border previously emphasized. Those lesions upon which rodent ulcer is prone to develop, or which resemble it from the outset, can often be differentiated only by the history and course, and, conclusively, by microscopic section.

Lupus vulgaris is distinguished from rodent ulcer and other types of carcinoma of the face by its appearance, as a rule, in the young; by the softness of the lesion; and by the brown, "apple-jelly-like" nodules seen with the dioscope.

The initial lesion of syphilis requires differentiation especially from rodent ulcer and carcinoma of the tongue and lip. The age of the patient (though advanced age by no means rules out chancre, as hospital operative records not infrequently show), the history and rapid appearance of the lesion, the recognition of the *Spirocheta pallida*, the associated regional adenopathy, which is apt to be marked, and the subsequent appearance of the secondary manifestations of syphilis (the necessity for waiting for which in order to rule out cancer should not, as a rule, be the case)—all of these points determine the diagnosis. Tertiary lesions are recognized by the anamnesis; by their multiple character (the nodular form by its serpiginous outline, with nodule-studded border); and by the finding of characteristic scars. The epithelioma spreads slowly from a given point; syphilis heals, leaves scars, and appears in new areas. Finally, the differentiation may be made by the therapeutic test (which should be given a convincing but not dangerously long trial), and, if necessary, by the microscope. Syphilitic involvement of the penis, the breast, and other parts is distinguished by the same criteria.

The patch of blastomycosis does not present an indurated edge, and forms fungus-like masses, with miliary abscesses at the periphery, which always show the specific organism.

Treatment.²—The treatment of carcinoma of the skin consists in the removal of the growth either by excision, curettage, cauterization, or by the use of x-rays or radium.

¹ Jour. des Mal. cut. et Syph., 1901, s. vi, xiii, p. 106.

² Bibliography: Bloodgood, Trans. Amer. Med. Assoc., Sec. on Derm., 1910, p. 144 (The surgical treatment of cutaneous malignant growths). Pusey, *ibid.*, p. 174 (Treatment of malignant growths of the skin from a dermatological standpoint). *Idem*, Jour. Amer. Med. Assoc., 1913, lxi, p. 552 (What can be done in cancer with Röntgen rays).

Conspicuous in the recent contributions to the subject of carcinoma of the skin stands the employment of x -rays. It has been shown to be the therapeutic agent of choice in rodent ulcer and other superficial forms, when the condition is not hopeless.

Since Stenbeck, in 1899, exhibited a patient from whom he had removed a rodent ulcer by the use of x -rays,¹ the value of the method in certain types of cutaneous carcinoma has been established by the reports of a large number of observers.

The results obtained in our years of experience (in several hundreds of cases) with x -rays in the treatment of cutaneous carcinomata are extremely satisfactory. When the carcinoma involves the lower lip, excision should be advised except in the most superficial varieties. Where the growth involves the tissues deeply about the cartilages of the ear, it is very resistant to x -rays, and in the majority of such cases excision, followed by radiotherapy, is probably the best procedure. With these exceptions, the method gives excellent results. (For description of apparatus, consult the chapter on Radiotherapy.)

In a given case the treatment is employed, as a rule, daily or on alternate days. The average time consumed in treatment and recovery is two months. With the surrounding tissues properly protected with lead, exposures are made with a medium hard tube, its quality, however, varying with the depth of the growth. The distance of the target from the lesion varies from four to ten inches. The time occupied for each exposure is three to ten minutes. Treatment is suspended usually on the first appearance of reaction, and resumed, when necessary, after the latter has subsided. MacKee² and some others employ the single-dose method, rather than several divided doses as above outlined.

The chief advantages of radiotherapy lie in its painless application and excellent cosmetic results. It should be the method of choice in all superficial cases which, owing to location or to the large areas involved, cannot be treated surgically without conspicuous disfigurement. The treatment is of special value in diffused hyperkeratoses and senile skins showing beginning malignant changes. For practically all superficial lesions the method is satisfactory, but for circumscribed lesions more time is required than in simple excision. In deep-seated tumors, though radiotherapy is often successful if the growth be fully exposed to the surface, it is better to remove surgically as much of the tumor as possible and follow with the x -rays. In deep-seated lesions beneath the unbroken integument, and especially those seated about the neck, we have had no success whatever with x -rays further than to relieve pain and temporarily retard the growth.

¹ Pusey: The Röntgen rays in therapeutics. Williams: The Röntgen rays in medicine and surgery. Freund, *Grundriss der Gesamten Radiotherapie*, Vienna, 1903. Allen, *Jour. Cut. Dis.*, 1903, xxi, p. 75. Sequeira, *Brit. Med. Jour.*, June 6, 1903. Hyde, Montgomery and Ormsby, *Jour. Amer. Med. Assoc.*, January 3, 1903. Sir Malcolm Morris, *Brit. Jour. Derm.*, 1912, xxiv, p. 169.

² *Jour. Cut. Dis.*, 1911, xxix, p. 503.

Radium acts similarly to x-rays, but has the disadvantage of being difficult to procure in large enough quantity to secure best results.¹

While x-rays, radium, and excision by surgical procedure are the methods of choice, certain others have been found of value. These consist in cauterization or combined curettage and cauterization. Among the caustics employed is potassium hydroxid, which may be used in stick or in strong solution, controlling its destructive action by the topical employment of acids. Its use is followed by less pain than is the employment of some of the other chemical agents. Other caustic substances employed for a similar purpose are: zinc chlorid, Vienna paste, silver nitrate, arsenical paste, resorcin, fuchsin, and pyrogallol. The latter is highly recommended by Kaposi, not only because its application is unproductive of pain, but also because it does not attack sound tissue. It is used in an ointment of 10 per cent. strength. All such pastes and ointments should be spread upon cloths, and be applied for from three to six days. Opiates may be required in the case of several of these agents to relieve the consequent pain.

Among the formulæ used for caustic purposes is the following:

R—Creasoti,	3 ss;	15	
Arseni trioxidi,	gr. iv;		266
Opii pulv.,	gr. ij;		133 M.

Sig.—For employment upon circumscribed surfaces (Kaposi).

Marsden's paste, also employed as a caustic, is made by combining equal parts of gum arabic and arsenic trioxid with water sufficient to make a solid paste. By Robinson² it is preferred to others and is applied on rubber plaster.

Cosmè's paste, as modified by Hebra, is prepared as follows:

R—Arseni trioxidi,	gr. vj;	40	
Hydrarg. sulphid. rub.,	3 ss;	2	
Unguent. aq. ros.,	3 ss;	15	M.

Sig.—Arsenical paste for external use, with caution.

The method of its application is as follows: The paste is spread over a thin sheet of lint to the thickness of a knife-blade, and the lint is then cut to a shape and size corresponding with those of the tumor or ulcer to be destroyed. After their close apposition with the surface to be attacked, the lint and paste should be covered with gutta-percha or other impermeable tissue, and a compress laid over the whole. In twenty-four hours the dressing is removed, the parts washed clean, and the same application renewed. By the third or the fourth day the destruction of the cancerous growth is usually complete, and the parts are ready for an emollient poultice, which should be applied for the three or four days during which separation of the slough occurs. The simple ulcer left is to be treated on general principles. The danger of arsenical poisoning is here reduced to a mini-

¹ Wickham and Degrais: Radium-thérapie, Paris, 1900. Simpeon, Trans. Amer. Med. Assoc., Sec. on Derm., 1913, p. 30. Clark: Radium treatment of cutaneous epitheliomas by single or massive doses, Jour. Amer. Med. Assoc., May 9, 1914, lxii, p. 1453.

² Internat. Jour. of Surg., 1892, p. 179: Treatment of cutaneous malignant epitheliomata.

mum; and the treatment is very effectual where patients consent to the delay and to the severe pain which the treatment occasions.

The thermo- and galvano-cautery may also be often advantageously used for destruction of the growths. The advantages of the thermo-cautery are: the transitory character of the induced pain; the coal-like dressing left upon the attacked surface; and the elegance of the resulting scar. Both measures find their highest value when employed after incision or erosion.

Carbon-dioxid snow may be employed in small, superficial, beginning growths. Not infrequently, a combination of two methods will give better results. Sherwell¹ has had remarkably good results with curettage, followed by cauterization with a solution of the acid nitrate of mercury. Culver² uses a combined treatment of curettage, cauterization with chromic acid, and x-rays, with good results.

Whatever method be employed, thoroughness in attacking all portions of the new-growth is essential; and it is well to encroach somewhat upon the unaffected contiguous structure. The subsequent dressings should be made with simple or carbolated unguents, to which one of the salts of morphin may be added in case of continuous pain. The eschar usually separates in the course of a few days, leaving a simple granulating wound, which may soundly cicatrize, and the epithelioma be thus radically relieved. In other cases the disease may reappear in the ulcer or cicatrix, or, by recurrence of cancerous nodules, in the previously sound integument. Even after these recurrences prompt destruction of the new-growth may finally be successful.

Prognosis.—In general, the prognosis of cutaneous cancer is grave. The relative degree of gravity will be proportioned largely to the variety, form, size, career, and complications of the growth in each case. The variety in which only "pearls" form in the skin is the most benign, as the lesions are usually isolated, and may, when unirritated, undergo spontaneous exfoliation. In other cases the disorder for from fifteen to twenty years seems to make no progress of any sort. The malignity of a cancerous growth is usually proportioned to the quantity of epithelium present as compared with the connective tissue; the more abundant the latter, the more favorable the prognosis. Naturally, also, the deeper and the more destructive the growth, the fewer are the chances of ultimate recovery. Excessive pain and adenopathy are unfavorable symptoms in any case. The superficial types, when recognized early and appropriately treated, offer by far the best prognosis.

RHINOSCLEROMA.³

Definition.—Rhinoscleroma is a chronic inflammatory process involving the nose, lip, and upper air-passages, characterized by hardening

¹ Jour. Cut. Dis., 1910, xxviii, p. 487.

² California State Jour. of Med., 1911, ix, No. 8, p. 340.

³ For bibliography, see Marschalko, Archiv, 1900, liii, p. 163; *ibid.*, liv, p. 235 (a histological and bacteriological study of two cases, with full review of subject); Castex, La Pratique Derm., t. iv, p. 187.

of the tissues and deformity. The disease was first described by Hebra and Kaposi, in 1870, and has a somewhat restricted distribution, being found largely in southwestern Russia. Cases have been recorded in America by Wende,¹ Pollitzer,² Lieberthal,³ Harmon Smith,⁴ Friedberg,⁵ Stelwagon,⁶ and Alderson,⁷ only one of which was indigenous, the remainder being imported.

Symptoms.—The disease commonly begins in the septum or a single ala of the nose, without inflammatory symptoms. The involved parts slowly enlarge, and become finally as dense as ivory. The individual lesions are flat patches, or elevated and circumscribed nodules, papules, and tubercles, painful upon pressure, movable to a certain extent over underlying tissues, and covered either by a normal integument, or by a light- or dark-red, shining, vascular epidermis. Neither hairs nor glands are discernible over the lesions. As the disease progresses the alæ become enlarged, flattened, and so indurated that they cannot be pressed together; while respiration may be impeded by stenosis of the nares. The process may extend to the neighboring parts, involving thus the upper and lower lips, gums, velum, epiglottis, larynx, trachea, and jaws, the teeth meanwhile falling from their sockets and the soft palate becoming in some cases perforated. Involution of the process has not been observed, and the lesions do not degenerate by ulceration. Max Zeissl,⁸ however, reports a case in which there was ulcerative destruction of the entire left nostril, as well as of the tip and right ala of the nose. Occasionally, superficial excoriations have occurred, but very rarely a diminution in the consistency of the mass. The disease pursues a chronic course, requiring years for its development; and though the affected parts are painful on pressure, they are otherwise not the seat of subjective sensations.

Etiology and Pathology.—The disease is observed between the fifteenth and fortieth year, in persons of all social grades and in individuals of both sexes. A microorganism was discovered in the tissue by Frisch,⁹ which has been considered etiological. In the early histological study, Kaposi observed a dense infiltration of the corium with small, closely packed cells, which he recognized as a true new-formation. Later investigations have shown the disorder to be a plasma-cell infiltration of the corium, associated with collagenous hypertrophy, and further characterized by the presence of two peculiar types of cells. The characteristic cell originally described by Mikulicz is large and contains clumps of bacilli, supported by a gloea, the latter material being a peculiar mucoid or watery substance. Other cells are seen which have undergone hyalin or colloid degeneration. The microorganisms are found in the lymph-spaces as well as in the char-

¹ Jour. Cut. Dis., 1896, xiv, p. 90.

² Ibid., 1911, xxix, p. 638.

³ The Laryngoscope, August, 1910.

⁴ Jour. Cut. Dis., 1913, xxxi, p. 427 (case demonstration).

⁵ Ibid., 1914, xxxii, p. 308.

⁶ Wien. med. Wochenschr., 1880, p. 621.

⁷ Ibid., 1910, xxviii, p. 388.

⁸ Ibid., 1912, xxx, p. 100.

⁹ Ibid., 1882, xxxii, p. 958.

acteristic cells. The collagenous hypertrophy is particularly marked at the periphery of the growth, the centre being more or less filled with a cellular infiltrate. In the later stages sclerosis occurs throughout the entire area.

The bacillus described by Frisch and Paltauf is short, with rounded ends, and enclosed in a gelatinous capsule measuring 2 microns in length and 0.5 micron in width. It is arranged singly, in pairs, or groups, and lies in the gloea of a Mikulicz cell, or free in lymph-spaces. It presents a close resemblance to the pneumococcus of Friedländer and the *Bacillus ozenæ*, with which it is by some considered identical. Perkins,¹ in a study of the organism of rhinoscleroma, classes it as a member of the *Bacillus mucosa capsulatus* group, in which are included Friedländer's bacillus and the *Bacillus ozenæ*. He considers that the organisms found in the nose in this disorder vary in different cases, though of the same general group, and that the so-called rhinoscleroma bacillus has no etiological relation to the disease, but is rather a secondary infection. Morris and Dore² found a short, coccoid, Gram-negative, capsulated bacillus, corresponding to the bacillus of Frisch, and resembling Friedländer's pneumobacillus.

While the organism is pathogenic to animals, the disease has not been reproduced by its inoculation.

Diagnosis.—The disease can hardly be mistaken for another, in consequence of its situation, the disfigurement it occasions, the ivory-like elasticity and induration of the affected parts, and the rarity of ulcerative degeneration. As distinguished from syphilis, it is known to be unaffected by specific medication. Since rhinoscleroma, however, has been by some writers assumed to be a form of syphilis, it is needful to distinguish clearly between the two. But as in the former affection there is rarely softening of the ivory-like induration, much less ulceration, which is common in syphilitic gummata, the distinction is tolerably clear.

From the variety of acne rosacea of the nose known as rhinophyma, rhinoscleroma is readily differentiated by the softness and compressibility of the acneiform affection and its evident vascular and glandular composition. (*Cf.* section on Gangosa.)

The ulcerations of epithelioma have a more circular outline, a more elevated edge, and occur in persons of a more advanced age. Keloid, if found in the situation of rhinoscleroma, does not ulcerate.

Treatment.—The method of relief thus far employed is a total or partial extirpation of the neoplasm. Kaposi speaks of dilatation of the nares, where there is actual or threatened nasal occlusion, by means of laminaria and compressed sponge. Both excision by the knife and destruction by caustics have been found to secure merely temporary benefit, as the growth is reproduced with rapidity. More recently, x-rays have been employed with success. Pollitzer³ recorded the case of a patient who remained well for three years after treat-

¹ Jour. Infec. Dis., 1907, iv, p. 51.

² Brit. Jour. Derm., 1913, xxv, p. 101.

³ Loc. cit.

ment with *x*-rays. Friedberg and Lieberthal record improvement from the use of *x*-rays alone or combined with surgical treatment; and Smith reported much improvement in three patients treated with *x*-rays and autogenous vaccine.

Prognosis.—In most instances the future of the patient is grave. The disease may, however, last for many years without producing other than local destructive effects. Interference with respiration, due to obstruction, is to be remembered, and the frequent recurrence after surgical procedure.

TUBERCULOSIS CUTIS.

Tuberculosis is one of the most common, formidable, and destructive of the great scourges of the human family. It may attack, either primarily or secondarily, any organ or tissue of the body. The skin is not rarely the seat of its ravages, and when extensively involved the results are in the highest degree disfiguring and repulsive.

The disease occurs usually early in life, because at that period the skin is more easily invaded, and also on account of the habits and environment at this time. Tuberculosis of the skin may be the result of a general infection of the body, or may, on the other hand, be the starting point of such infection. In either event, the disease is always acquired by infection, and not by inheritance. The coincidence of several members of one family exhibiting evidence of the disorder is most readily explained by the opportunities for infection furnished in such families.

In the past, many phases of tuberculosis were classed as distinct entities, and in consequence numerous names have been used which have now been eliminated. The commonly recognized clinical forms of cutaneous tuberculosis are the following: (1) lupus vulgaris; 2 tuberculosis verrucosa cutis; (3) tuberculosis cutis orificialis; 4 scrofuloderma. A group of affections induced by the toxins of the bacillus of tuberculosis is described under the title "tuberculides." The position of *erythema induratum* of Bazin is uncertain. Some cases of this disorder are undoubtedly produced by the bacillus of tuberculosis in the situation; others appear to be due to toxins, with the active focus at a distance; while a few occur which cannot be determined to be tuberculous.

Lupus Vulgaris.—**Symptoms.**—The symptoms of lupus vulgaris are both numerous and diverse, a fact which may account for the many names which have been applied to these different manifestations, and which with few exceptions are descriptive merely of certain external features.

The primary lesion is a small, soft, reddish, yellowish, or reddish-brown nodule, situated in the corium. It may be elevated moderately or show no elevation, and may or may not be scale covered. The patches are formed by multiplication and coalescence of these nodules. The lesions commonly begin about the nose and spread very slowly

over the cheeks. As a rule, little subjective sensation is present, and, except for the gradual enlargement, little change is noted for long periods of time. Under pressure with the dioscope, the inherent brown color of the individual nodules of which the patch is composed is revealed. This peculiarity is characteristic and important in diagnosis.

The early lesions above described have been termed *Lupus Maculosus*, *Lupus Planus*, and, after elevation of the lesion and the production of distinct, visible nodules or tubercles, *Lupus Nodosus*, *Lupus Tuberculatus*, *Elevatus*, *Tumidus*, *Non-exedens*, and *Non-ulcerosus*.

At times there may be extensive edema, thickening, hypertrophy, hyperplasia, pachydermia, and even telangiectasis, and an accompanying lymphangitis or lymphadenitis. To these forms the terms *Lupus*

FIG. 177



Lupus vulgaris.

Hypertrophicus, *Papillosus*, *Edematosus*, *Elephantiaticus*, *Tumidus*, and *Exuberans* have been applied. In certain cases marked scaling occurs, and as the patch spreads peripherally cicatrization occurs in the centre, producing a depression, and to this form the terms *Lupus Exfoliatus*, *Lupus Psoriasiforme*, and "*Lupus-psoriasis*" have been applied.

In certain cases, as the disease progresses, a fibrous metamorphosis occurs in the early part of the lesion, producing a sclerotic mass. By contraction of this tissue much deformity may be induced. This type has been designated *Lupus Sclerosus*, *Scléreux*, *Fibrosus*.

In the ulcerating type of lupus (*Lupus Exedens*) oval or circular ulcers are formed, which are well defined, though irregular as to margin,

FIG. 178



Lupus hypertrophicus.

FIG. 179



Lupus vulgaris of the leg.

shallow, thin-edged, and flattish. Their floors are dirty-reddish or purplish in color, indolently granulating, furrowed, hemorrhagic, or, when cicatrizing, healthy. When pus is freely formed, whether superficially or deeply, crusting ensues, and the débris of epidermis becomes entangled with the desiccated crusts. These crusts are variously colored and differ in thickness with the severity of the process beneath. When the ulceration advances, it may be superficial, deep, or have other peculiarities, and be subject to the various accidents of the ordinary process of ulceration, whence the names *Lupus Serpiginosus*, *Profundus*, *Superficialis*, *Gangrenosus*, *Exulcerans*, and *Rodens*. The names *Lupus Crustosus* and *Rupioides* are descriptive of the crusting form. When exuberant granulations occur, elevating the floor of the ulcer, the condition has been termed *Lupus Fungosus*, *Fungoides*, or *Vegetans*. *Lupus Keloides* indicates a cicatricial overgrowth of the scar-tissue left after any one of the several conditions described above.

Lupus vulgaris attacks by predilection the face. After this the extremities and various parts of the body may be invaded. Forchhammer¹ observed in a group of 1200 cases of lupus treated between the years 1896 and 1906 that the primary sites of the disease were as follows: on the face, 81 per cent., of which 50 per cent. began on the nose and 28 per cent. on the cheek; on the neck, 8 per cent.; on the ears, 2 per cent.; on the upper extremities, 8 per cent., and on the lower extremities, 1 per cent.

On the face, the disorder usually begins on the cheek, or about the nose, as a dull-colored maculation or minute nodule, or as a purplish thickening of the skin. Gradual extension of the patch occurs as above indicated, and, as a rule, in this country, not much further change is noted for some time. In certain cases, after absorption of the lupous tissue from the nose, the latter becomes shrunken and retracted to a miniature of its former dimensions, its tip being noticeably reduced to a sharp point, producing thus the characteristic deformity suggesting the beak of a parrot. In other cases, the point becomes bulbous, flattened, livid, and knobbed, with a thickened septum and disordered alæ, an isolated patch or two of the lupous infiltration still remaining in the neighborhood of the cheek on one or both sides.

FIG. 180



Lupus vulgaris in a colored patient.

¹ Die Bekämpfung der Lupus Vulgaris in Dänemark, 1896-1911 (Proceedings of the sittings of the Lupus Congress of the German Central Committee—"Bekämpfung der Tuberkulose"—Berlin, April 21, 1911; abstr. Brit. Jour. Derm., 1911, xxi., p. 338).

The subcutaneous tissue, mucous membrane, and cartilages may be destroyed, and in place of the nasal organ itself there may be left eventually two ovoid cavities in the face, separated merely by the posterior flange of the septum.

In severe cases, large portions of the skin of the head (cheeks, lips, nose, eyelids, chin, ears, brow, and neck) become altered, producing a marked and characteristic deformity, reducing the openings of the mouth and lids to narrow slits, interfering with vision, speech, and mastication, and producing a marasmus from these causes alone before there is ulceration at any point.

FIG. 181



Lupus vulgaris.

The upper lip, when involved, becomes first swollen, fissured, hemorrhagic, and crusted, and the granulating surface indicates extension of the disease to the adjacent mucous membrane. Great deformities are thus produced after healing and scar-formation have occurred.

The lobule of the ear is a favorite site for lupus to attack, the characteristic appearance of the early lesions being present. At a later period, either with or without ulceration, the auricle may disappear or be reduced to a shrunken shell of its former state, the external auditory meatus being occluded by the same process.

On the body, the lesions are usually more extensive but less destructive. Giant areas occur over the loins, the hips, and trunk, and frequently in the form of superficial, serpiginous ulceration, the centre

healing as the peripheral ring spreads. Gyrate and other figures are induced by the joining of these circles.

On the extremities, the early lesions are similar to those in other areas, but here great deformity occurs later through interference with mobility of the smaller bones of the hands and feet, as the result of rigid cicatrices, and also of the accompanying caries and osseous necrosis. Mutilating effects are thus produced by loss of phalanges, and also by shortening of the hand or foot after the destruction of bone. Elephantiasic enlargement, thickenings, ridges, knobs, nodules, warty excrescences, ulcers, crusts, and callosities are often commingled. The term *Lupus Mutilans* has been used to describe this variety. Lupus of the genital region has been described, but is of rare occurrence.

FIG. 182



Lupus vulgaris serpiginosus.

The disease frequently attacks the mucous membranes, particularly that of the nose, and it is thought by some observers that this is the usual starting point of the disorder. The statistics of Forchammer in 800 cases of lupus showed involvement of the mucous membrane in 72 per cent., and in these cases recurrences were chiefly due to reinfection from the mucous membrane. In a large number of cases at the London Hospital with involvement of the mucous membrane, Sequeira¹ found the larger proportion to involve the nasal mucous membrane; then, in the order of frequency, the lips, the buccal mucosa, the gums, the palate, the larynx, and the tongue. In these

¹ Allbutt and Rolleston's System, ix, p. 472

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¹ Allbutt and Rolleston's System, ix, p. 472

regions, owing to the warmth and moisture, the lesions appear as moist, papillary growths or granulating patches, which may ulcerate and cicatrize. The borders are well defined, and the surface reddish or pallid, or of a dirty, grayish-white color when the investing epithelium is loosened but not detached. On the tongue the lesions may be papillomatous, or ulcerating, and the gums appear swollen and ulcerated. Frequently, the teeth are exfoliated.

As a rule, the course of the disease is slow. For a quarter of a century a lupus patch may be limited to a space no larger than the palm of the hand and exhibit some evidence of activity during the greater portion of that period.

While lupus vulgaris usually occurs as a slowly progressing disorder, more acute cases are recorded, usually following measles, and these are recorded under the title *Multiple Disseminated Lupus Vulgaris*. This form usually occurs in children. Adamson¹ collected a series of 28 cases of this type. MacLeod,² Sequeira,³ Dore,⁴ and others have reported cases of similar type. In these, multiple lesions appear suddenly scattered about the body-surface. These consist of small, discrete nodules or patches, varying in size from that of a split-pea to coin-size and larger. The patches are made up of an aggregation of typical lupus nodules, and may be scale covered (resembling psoriasis) or verrucous. In a patient seen by the author, numbers of small brown nodules occurred irregularly disseminated over the trunk, with psoriasiform patches over the extremities. Later the patient developed a tubercular spondylitis, and in the course of some years the scaling patches became verrucous and were then typical of lupus verrucosa. A case representing the above type occurring in an adult, not preceded by measles, is recorded by Little.⁵

The variety of the disease described as *Erythematoid Lupus Vulgaris* occurs as one or more patches, usually upon the face, and usually asymmetrically. These patches present a raised, scaling border and depressed atrophic centre. They are reddish in hue, the color only partially disappearing upon pressure. Some yellowish miliary nodules may be observed under the diascop. The course of the disorder is chronic, and its resemblance to lupus erythematosus is striking. These cases have all been proven, microscopically and culturally, to be unusual forms of lupus vulgaris.

Complications of Lupus Vulgaris.—The disease may be associated in the same patient with other varieties of tuberculosis of the skin, such as verrucous tuberculosis, scrofuloderma, and tuberculous ulcers. Bone and joint tuberculosis may also be present. Visceral and pulmonary tuberculosis may follow, and erysipelas occurs not infrequently, the latter at times having a beneficial effect on the lupus. Carcinoma occurs as a sequel in from 2 to 4 per cent. of cases.

¹ Brit. Jour. Derm., 1904, xvi, p. 366.

² Ibid., 1913, xxv, p. 99.

³ Ibid., 1911, xxiii, p. 49.

⁴ Leloir, Jour. Mal. Cut., May, 1891, p. 241.

⁵ Ibid., 1907, xix, p. 390.

⁶ Ibid., 1910, xxii, p. 233.

Tuberculosis Cutis Verrucosa.—This form of tuberculosis of the skin is characterized, as its name indicates, by warty lesions. The common type is the anatomical tubercle or post-mortem wart, which in 1884 was proven to be tuberculous by the discovery of the bacillus in the lesions. In 1886, Riehl and Paltauf¹ described a somewhat similar but more extensive variety of this form. These lesions are always produced by direct inoculation, and may therefore be considered the inoculation type of cutaneous tuberculosis.

Verruca Necrogenica (*Post-mortem Tubercle, Dissection Tubercle, Anatomical Tubercle*).—This disorder was first termed verruca necrogenica by Wilks.² It occurs usually on the fingers (especially on the dorsum of the thumb and index finger) of those engaged in the handling

FIG. 183



Tuberculosis cutis verrucosa.

or dissection of cadavers; or it may be caused by other accidental inoculations with the tubercle bacillus. It begins at the site of an abrasion or wound as a papule, papulo-pustule, or vesico-pustule, with a deep-seated base and reddish or reddish-purple areola. The lesion becomes encrusted and spreads peripherally. Hyperkeratosis follows, and after a time an indurated, horny, pigmented lesion forms, which may become fissured at one or more points. As a rule, the lesion becomes split-pea- to bean-sized, usually remains single, and may thus persist for months or years. At times, dermatitis and suppuration may complicate the process. In a very few cases grave symptoms result,

¹ Archiv, 1886, p. 19.

² Guy's Hosp. Reports, s. iii, viii, p. 263.

either in the involvement of the deeper tissues (subcutaneous, thecal, tendinous, periosteal), or in the production of erysipelas, pyemia, septicemia, or gangrene. Surgeons divide these cases into mild and acute varieties, according to the symptoms exhibited. In a few instances the local process has been followed by generalized tuberculosis.

Tuberculosis Verrucosa Cutis (Riehl and Paltaut).—This is a more extensive variety of a similar process, also due to inoculation from without. The lesions in this type occur most frequently on the dorsal surface of the hand, whence they may spread up over the forearms, very rarely over the palms. They also occur on other portions of the body, such as the area covering the inner malleolus and various portions of the limbs. The lesions occur as plaques, which are insensitive, variously sized from small-coin to palm or larger; are single or multiple, definitely circumscribed, ovoid or scalloped in outline, brownish-red

FIG. 184



Tuberculosis verrucosa cutis.

in color, movable, and are often covered with fine, pointed vegetations, minute pustules, and even crusts. Frequently, pus may be expressed from between the verrucous lesions. When healing occurs, a smooth and scaling scar usually results. In certain instances, particularly over the forearms, the scar exhibits a stippled appearance, similar to that seen following lupus erythematosus.

Cases of this type have been seen in miners, the subjects of consumption, who have had the habit of wiping their mouths with the backs of their hands. It is reported frequently among the miners in the district around Dortmund, Prussia. Sequeira¹ records the case of a patient infected through a wound produced by an electric-lighting wire, while he was working in a butcher-shop.

This disease very closely resembles cutaneous blastomycosis, from which it is to be distinguished. The glands may become infected

¹ Loc. cit.

early, and visceral complications are not uncommon. Instead of the comparatively dry, warty lesions above described, cases occur in which exuberant, soft, and florid excrescences rise one or two centimeters above the general level, the individual elements being separated by deep fissures, and the whole bathed in purulent mucus and frequently covered with dark crusts. This type was early described by Morrow.¹ Another variant is that described by Riehl as *Fibromatosis Tuberculosa Cutis*, in which there is not merely a papillomatous, but often a sclerotic, growth found on the lips, nose, cheeks, or about the anus or other mucous outlet of the body, interspersed with verrucous lesions, vegetations, and small, shallow ulcers. The tuberculous masses may be in the form of tumor-like bodies or thickenings of the subcutaneous tissue.

Elephantiasis Tuberculosa Cutis is a term applied to gigantic overgrowths of the integument, complicated by lymphatic occlusion. In these cases there has usually been a blocking of the lymphatic channels. It is chiefly important to note in this connection that accidental inoculations with the bacillus of tuberculosis produces in different individuals different clinical results, the common and characteristic train of symptoms being the warty lesions above described.

Scrofuloderma.—The term scrofuloderma should now be limited to those lesions in the skin produced by the local action of the bacillus of tuberculosis by direct extension from some structure beneath the skin. The lesions, therefore, occur most frequently in the neck, from tuberculosis of the glands, and about joints and over bones, which are most frequently attacked with tuberculosis.

The scrofulodermata are characterized by the occurrence of pathological processes in the skin, lymph-glands, or periglandular tissues, which betray evidence of the tuberculous process. They usually begin as firm, well-defined, subcutaneous nodules, similar in type to the syphilitic gummata, which gradually enlarge, become attached to the skin, subsequently degenerate, exhibit typical ulcers, and usually terminate by characteristic cicatrices. The typical and commonest form of scrofuloderma is encountered about the face and neck, where the lymphatic glands have long been tumid, and are either dense or doughy to the touch. Usually this condition is reached very slowly; often months and years are required for its production. The glands may be as small as almonds, or as large as the closed fist. Gradually the characteristic inflammation ensues in the skin which is superimposed. The latter becomes purplish and thinned, and finally yields, giving exit to a sero-purulent fluid mingled with caseous matter and blood. Fistulous tracts and sinuses result, which undermine and perforate the skin, resulting in the production of a chronic discharge and characteristic ulcers. The ulcers are usually linear, occasionally elongated and oval, rarely circular. Their floors are uneven, covered with pallid granulations, and secrete a watery

¹ Jour. Cut. Dis., 1888, vi, p. 401.

pus. The edges are undermined, tumid, inverted, and usually not changed in color. The edges of the ulcers are frequently thinned by stretching over fistulous pockets, and may be reddish or purplish in hue. The bases of the ulcers are attached deeply to the subcutaneous tissue, and are firm or soft, and never densely indurated. Fistulae may be discovered extending to the point of origin of infection. The crusts are thin, tenacious, reddish or brownish, and usually have the shape of the preceding ulcer, which is frequently linear, rarely bulky, or rupioid. The resulting cicatrices are corded, depressed in irregular lines or bands, and often alternate with equally irregular nodules (*scrofulous gummata*), where the process either has been arrested or is still in activity.

FIG. 185



Scrofuloderma.

Rarely large ulcers are formed by the dissection of areas of subcutaneous and intramuscular tissue in the neck or even over the extremities. The number of lesions in this type of tuberculosis is usually few, being limited, as a rule, to from two to six.

Another type of scrofuloderma is that described as *Scrofulous Gummata*, which begins with a subcutaneous nodule on the back or over the extremities, more commonly in children, and in which there is no connection with gland, bone, joint, or other structure. The career of these lesions is practically that outlined above. Scrofulodermata usually occur in children and young adults and in persons of low vitality.

A group of cases described under the title *Tuberculosis Fungosa Cutis* (Riehl) presents tumors resembling those seen in granuloma fungoides and sarcoma, intermingled with other lesions of tuberculosis of the skin. These cases originate, as a rule, in an infected bone, muscle, or other structure beneath the skin, the latter being invaded by direct contiguity; which fact therefore places the condition in the category of the scrofulodermata. Pick¹ reported two cases of this type, and, referring to the literature of others, maintains that it should be kept as an entity. It is essentially an infiltrating form of cutaneous tuberculosis, with excessive granulations, forming fungous tumors, and having in addition ulceration, crusts, and fistulous tracts, in which cheesy degeneration is abundant.

At times, scrofulous gummata, occurring in small-nut- to egg-sized tumors, form along the lymph-vessels of the lower extremities particularly. When such a tumor breaks down, it furnishes the typical picture of the scrofulous ulcer, with its cheesy and watery pus, thin, even edge, and indolent career. In these cases tubercle bacilli have been recognized in the secretion. The condition was first described by Bazin as *Tuberculous Lymphangitis*. Hallopeau and Goupil described a condition of tubercular lymphangiectasis in which there were swellings of the lymph-vessels, from the secretion of which tubercle bacilli were obtained, and in which systemic infection not infrequently followed.

A hitherto undescribed variety of tuberculosis cutis is recorded by Wende,² under the title: *Nodular Tuberculosis of the Hypoderm*. The case presented subcutaneous nodules, varying in size from that of a pea to a pigeon's egg, situated on the chin, cheek, and temple. The lesions would appear, grow slowly, and would finally disappear and new ones form. They were unaccompanied by any redness or scaling of the skin. The nodules were painful to the touch. There was no suppuration or ulceration. The microscopic sections were characteristic of tuberculosis; the histological architecture was that seen in erythema induratum. Tuberculin tests and inoculation experiments in animals were positive. Treatment with injections of tuberculin proved beneficial.

While not conforming to any of the types described above, this condition resembles to a marked degree the scrofulous gummata, but the age of the patient and absence of ulceration are distinguishing features. It is also analogous to certain cases of erythema induratum, but, again, the location of the lesions and the presence of such numbers of tubercle bacilli would be unique for that condition. Its nosological position is therefore not definitely fixed.

Tuberculosis Cutis Orificialis (*Tuberculous Ulcers*).—The clinical forms included under the above title are those once supposed to be the sole manifestations of cutaneous tuberculosis. The title "tuberculosis of the skin" was, in fact, applied exclusively by many writers

¹ Jour. Cut. Dis., 1904, xxii, p. 305.

² Ibid., 1911, xxix, p. 1.

to the ulcers and their preceding lesions observed and described by Kaposi, Jarisch, and Chiari.¹ These were indolent, oval or circular, shallow, discrete, reddish-yellow, granulating ulcers, often covered with thin crusts, occurring about the mucous orifices of patients affected with internal tuberculosis and with development of miliary tubercles in the adjacent mucous tract. These ulcers occur most commonly about the lips, over the wings of the nose, and occasionally about the ears, in patients suffering with laryngeal, palatal, oral, or pulmonary tuberculosis; about the anal region in patients suffering with intestinal tuberculosis; about the glans in tuberculosis of the bladder; and about other parts of the external genital region in tuberculosis of the internal generative organs. In the case of a patient in advanced pulmonary tuberculosis seen by Dr. Hyde there was a tuberculous ulcer near the anus, and also a well-defined patch of infiltration in near proximity, highly suggestive of nodular lupus.

There may be one or several ulcers, which spread slowly and show no tendency to heal. As a rule, the ulcers are small, but occasionally they attain considerable dimensions.

Acute Tuberculosis has been described under different titles. In the case of children, this form is exhibited as macules, vesicles, bullæ, papules, and pustules, terminating in deep, crusted, circinate lesions, accompanied by caseation of the neighboring glands. In all of these lesions tubercle bacilli may be demonstrated, and inoculation with cultures results in distinct tuberculous infection.

A case of universal dermatitis of tuberculous type in an adult was reported by Bruusgaard,² in which the dermatitis was accompanied by a general enlargement of the lymphatic glands. In both glands and sections of skin a tuberculous structure, with tubercle bacilli, was demonstrated.

Exanthematous Miliary Tuberculosis of the skin may follow the exanthematous fevers in children. In this variety, the lesions are multiple, indolent, dull brownish-red, acuminate tubercles, situated in or near the cutaneous follicles, and suggesting the lesions of acne papulosa. After degeneration, they present rounded, circular, or polygonal, sharply-cut ulcers, having a violaceous border, an irregular, granular floor, and a scanty sero-purulent discharge. Miliary nodules are to be seen both on the floor of the ulcerative surfaces and in the periphery of the lesion. The presence of tubercle bacilli may be demonstrated. This disorder occurs, as a rule, in patients exhibiting other unmistakable symptoms of tuberculosis.

In addition to the above described ulcers and also those discussed in connection with lupus vulgaris, occasionally indolent ulcers of fairly large size occur on the limbs and other situations, which are considered to be tuberculous. This latter type of ulcer is to be carefully distinguished from syphilis.

¹ Vierteljahr, 1879, vi, p. 269.

² Archiv, 1903, lxvii, p. 227.

Etiology.—Accidental inoculation of tuberculosis may occur at all ages and in both sexes, the infective material gaining access to the economy, in a large number of instances, by the medium of the lymphatics. There is, however, opportunity for such transmission among the members of any family in which pulmonary tuberculosis exists; hence, the widespread belief in the heredity of the disease. There are certain factors that must be considered as indirect causes. The young, the delicate, and the cachectic furnish a proper soil for the tubercle bacillus. The mode of life among the very poor and the filthy and degraded classes predisposes to infection. In the major number of all cases of lupus vulgaris, the time of its appearance is during the first decade, between the third and the sixth years of life. It rarely begins after the thirtieth year, for the reasons above mentioned. The significant fact in this connection is that in this period of life a child, often deprived of the constant care of the mother by the demands made by a still younger infant, untaught in the simplest rules of cleanliness, picking and scratching the face after miscellaneous contacts of the fingers with all sorts of material, is exceedingly liable to inoculate the skin of the face with tuberculous virus, if there be victims of such disease occupying the same apartment or house. It is significantly first upon the face in these early years, to which the exposed hands have been carried, that the early symptoms of lupus vulgaris are seen. Further, it is noteworthy that well-marked cases are more frequent among the poor, the filthy, and the degraded than among the comfortable and cleanly. The prevalence of the disease in public as contrasted with private practice is conspicuous in all statistics.

Besnier, Little, and others report cases of lupus resulting from tuberculous infection in vaccination; Fournier, an instance in which a young woman was infected during the piercing of the ear for the insertion of ear-rings; Strauss, the case of a student who was wounded by a rapier in a duel and as a result developed lupus in the site of the wound; and Brums, an instance of infection by inoculation with a hypodermic syringe used for injecting morphin. Bernhardt¹ reported a case of cutaneous tuberculosis following ritual circumcision. Ernst² recorded a case of tuberculosis verrucosa cutis after tattooing and reports eight cases in the literature of cutaneous tuberculosis following the same operation, seven of which, including his own, were probably infected from tuberculous sputum. Among these eight cases one was tuberculosis verrucosa cutis, five lupus vulgaris, one tuberculosis cutis propria, one a tuberculide, and one unclassified. Dore³ and others have reported similar instances.

In verruca necrogenica and other types of verrucous tuberculosis, it is contact with the bodies of the dead or with tuberculous matter in any form that determines the result. Lassar⁴ reported two cases of verrucous tuberculosis in patients working with diseased cattle.

¹ Archiv. 1900, liv, p. 221.

² Derm. Centralb., 1907, xi, p. 66.

³ Brit. Jour. Derm., 1913, xxv, p. 257.

⁴ Zeitschrift, 1903, x, p. 505.

He concluded that these were examples of bovine tubercle bacilli inducing cutaneous tuberculosis in man. Fabry and Schulze¹ report large numbers of cases occurring among the miners in the district around Dortmund, Prussia. Lipschütz² states that the Riehl-Paltauf variety of tuberculosis verrucosa cutis is due most commonly to inoculation with the bovine type of the tubercle bacillus, while verruca necrogenica is probably due to inoculation with the human type of the bacillus.

Lupus vulgaris also may be produced by inoculation, but frequently the infection is brought to the skin through the lymphatics, and occasionally by way of the blood-stream. In the disseminated cases it is supposed that the bacilli are liberated from a localized focus during the attack of measles which this type usually follows, and spread through the blood-stream to various parts of the cutaneous surface. In scrofuloderma the bacilli find their way to the skin by direct extension from beneath. Wilson,³ in a careful examination of nine cases of lupus vulgaris, failed to find tubercle bacilli in the feces.

While tuberculosis cutis or orificialis is essentially an example of autoinoculation, it is usually secondary to visceral tuberculosis.

Pathology.—All the varieties of tuberculosis of the skin, which include lupus vulgaris, tuberculosis cutis verrucosa, scrofuloderma, and tuberculosis cutis orificialis, are due to infection with the tubercle bacillus, and are practically identical histologically with tuberculous lesions in other parts of the body. The discovery of bacilli in lupous tissue, first made by Koch, has since been verified by Doutrelepon, Weichselbaum, Meisels, Schuller, Lustig, and others. The striking resemblance, first shown by Virchow, between a caseous miliary tubercle and a lupous nodule had, even before Koch's discovery, pointed to an identity of origin. The tuberculous nature of these disorders has been proven in addition by inoculation experiments. Lenz, Huter, Schuller, ourselves, and others have produced tuberculosis by introducing in rabbits granulations taken from lupus and other varieties of cutaneous tuberculosis.

For our early knowledge of the microscopic character of cutaneous tuberculosis we are indebted largely to the Germans. Virchow, Auspitz, Billroth, Lang, Kaposi, Klebs, Stilling, and Thin have contributed amply to the subject. Recently Fordyce⁴ has presented his findings in the several varieties.

The histological structure of the various forms of cutaneous tuberculosis varies in minor particulars, but in essential features sufficient uniformity exists to enable the observer to discern that each is due to a similar exciting cause. Each is produced by the local action of the tubercle bacillus, and presents a cellular new-growth; vascular changes, ranging from slight proliferation in the coats of the vessels

¹ Archiv, 1904, lxx, p. 329.

² Ibid., June, 1914, cxx, p. 387.

³ Brit. Jour. Derm., 1910, xxii, p. 252.

⁴ Jour. Cut. Dis., 1914, xxxii, p. 23 (Histological study in some types of tuberculosis illustrated with eight microphotographs).

to their complete obliteration; and attenuation, hypertrophy, or complete destruction of the collagen. The sebaceous and sweat-glands, hair-follicles, and elastin all suffer alteration, even to destruction. The epidermal changes in all are secondary, and include acanthosis, hyperkeratosis, parakeratosis, scaling, and at times even complete destruction by ulceration. The tuberculous nodule in the skin resembles that found in other organs, and consists essentially of one or more giant-cells immediately surrounded by a number of small round cells, which have vesicular nuclei, and which are either mononuclear leukocytes or daughter plasma-cells (Unna). Interspersed among these may be a few multinuclear cells, and surrounding these is a zone of plasma- and connective-tissue cells. No vessels exist in the nodule, and the fibrous elements are either attenuated or completely absent. The nodule is surrounded in the nodular form of lupus by a collagenous capsule. In another variety no limiting capsule is present, and the cellular hyperplasia spreads along the lymph-spaces, producing an even, brownish discoloration of the skin, in which case giant-cells are not numerous.

Degeneration occurs in the nodule, as is shown by the cellular protoplasm becoming homogeneous, and the nuclei becoming incapable of absorbing stains normally. True cheesy degeneration seldom occurs in the skin, which fact might be accounted for by the relative scarcity of bacilli in most of these lesions.

The cellular hyperplasia is composed of giant-cells, which are large, oval, round, or irregularly shaped cells, containing, as a rule, many peripherally placed nuclei, and having a homogeneous centre; plasma-cells, which vary in size, are usually oval or oblong in shape, possess a large amount of protoplasm, and present an eccentrically placed vesicular nucleus; and small round cells, usually described as mononuclear leukocytes or daughter plasma-cells (Unna), which contain nuclei similar to the plasma-cells. In addition, some mast-cells are present, and in these the nucleus is surrounded by granules of protoplasm, which are identified by stains having metachromatic properties. Multinuclear cells are also present, and a large number of connective-tissue cells. Tubercle bacilli are found most abundantly in the acute miliary variety of cutaneous tuberculosis; most rarely in lupus vulgaris, in the lesions of which they are often difficult to demonstrate. Giant-cells are most abundant in lupus vulgaris; while cheesy degeneration, common to internal tuberculosis, is more prevalent in the miliary variety. Bacilli may be found between the cells, but are found more often in giant-cells. Animal inoculations may be performed successfully in each variety, and they all react to tuberculin injections.

Lupus Vulgaris occurs in two varieties, the nodular and the diffuse. In the former, the tubercles above described are enclosed in a limiting capsule of collagen, while in the diffuse variety the infiltration spreads evenly along the lymph-spaces without interruption, producing a diffuse infiltration. There is a tendency for the granuloma to be

replaced by connective tissue, which at times multiplies to an excessive degree, producing a condition of elephantiasis. As the cellular infiltration progresses, the normal structures of the skin are atrophied or destroyed; collagen, sebaceous and sweat-glands, hair-follicles, and, finally, elastin, all disappear. Proliferative changes may occur in the epidermis, in which marked down-growth (acanthosis) of the rete into the corium results, producing the papillomatous variety of lupus; while with increased cornification verrucous forms occur. Pressure from below may rupture the epidermis, permit pyogenic infection, and result in ulceration. Edema, with accompanying parakeratosis and scaling, may be present. All of these epidermal changes are secondary, however, and are in themselves not tuberculous, the principal and characteristic changes being found in the corium.

Tuberculosis Verrucosa Cutis is distinguished by having the tuberculous plasmoma located chiefly in the papillary layer of the corium. The usual structure of the tuberculous nodule may be demonstrated. Marked acanthosis and hyperkeratosis are also distinguishing features. Miliary abscesses, produced by pus-cocci, may be found both in and beneath the epidermis. Tubercle bacilli are usually more numerous than in lupus vulgaris, and find their entrance from without. Both histologically and clinically, this variety of tuberculosis is nearly identical with some of the forms of lupus vulgaris, and now often is classified as a manifestation of lupus vulgaris.

Tuberculosis Cutis Orificialis.—In this variety, both in the number of bacilli present and in the type of lesion, there is an analogy with the miliary tubercles of other organs. Large numbers of typical, circumscribed nodules are found deep in the corium. Bacilli are numerous and easily demonstrated. The degenerative processes go on rapidly, the tubercles breaking down and coalescing to form masses of softened necrotic tissue, which soon break through the epidermis to form an ulcer. About the borders of such necrotic areas new nodules are constantly forming, and the whole process is rapid, as in acute tuberculosis of other tissues. Histologically, it is composed of the usual tuberculous plasmoma, its distinguishing features being the presence of large numbers of bacilli, and also typical cheesy degeneration, which is not found in the other varieties.

Scrofulodermata.—The scrofulodermata originate in the subcutaneous tissues and involve the skin secondarily. The lymphatic glands or the tissues about the glands or lymphatic vessels become the seat of the tuberculous process, which runs a subacute course. The glands or periglandular structures finally break down into softened, necrotic masses. Such areas of necrosis may remain indolent and superficial, or, in case a gland is involved, may be deep and extend by burrowing prolongations even to the bone. Sooner or later, the skin over these softened masses becomes involved in a subacute inflammatory process and gives way, producing the typical ulcer, with soft, ragged, and often extensively undermined edges. Experimental inoculations

and the presence of tubercle bacilli have demonstrated these sub-cutaneous lesions to be tuberculous. The number of bacilli present varies greatly, being much larger than in lupus, but much smaller than in the orificialis varieties of cutaneous tuberculosis. The relationship of the scrofulodermata to lupus is occasionally shown by the formation of typical lupus nodules near the border of these scrofulous ulcers, the result, no doubt, of inoculation of the skin with a discharge from the ulcer. The granuloma here consists of a diffuse plasma-cell infiltration, with some giant-cells about the edges of the lesions.

Diagnosis of Tuberculosis Cutis.—Epithelioma, though rarely resembling lupus vulgaris, is more often designated by that than by any other false title. Great confusion has arisen over the looseness with which several authors have furnished illustrations of "lupus exedens," which were really pictures of cancer. But the latter is rarely a disease of early life, and when of early occurrence may not persist to adult years; the reverse of which is true in the majority of all cases of lupus. The nodules of lupus are absent in epithelioma, and their evolution in the disease is slower, less painful, and, in certain earlier periods certainly, of deeper situation. The ulcer of epithelioma is more often defined and single, though multiple epitheliomata are not uncommon. The edges of the epitheliomatous ulcer are whitish or pearly, indurated, and everted; its floor uneven and glazed; its secretions scanty, and occasionally fetid; its base a mass of indurated tissue. Lupous ulcers are often ill-defined and multiple; their edges soft and inconspicuous, neither everted nor undermined; their floors granulating and flattened; their secretion relatively profuse and generally odorless; their bases soft and pliable, though occasionally indurated.

Nodular, serpiginous, and ulcerative lesions of syphilis often resemble certain forms of lupus. In any doubtful case, a history of infection, of other types of cutaneous disease, of mucous patches, of adenopathy, of abortions in women, and, finally, recourse to the Wassermann reaction, should aid in the recognition of syphilis. The structure of the lesion should be examined carefully for the purpose of distinguishing characteristic lupous nodules in the patch itself or in the periphery of any exfoliating area. In the case of an adult, a history of long-existing lupus may often be obtained; and it is worthy of note that syphilis with exceeding rarity displays for long periods of time a single exanthematous lesion or aggregation of such lesions exclusively in one part of the body. Their history of appearing in one place, undergoing the usual evolution, healing, and appearing in other areas is characteristic. Lupous ulcers, often multiple and isolated, insensitive, well or ill defined in outline (never reniform or horseshoe-shaped), with supple, low edges and reddish, smooth, hemorrhagic, granulating floor, covered with crusts like soiled parchment, of uniform thickness, do not resemble those of syphilis. The latter are often painful, single, circular, and clean cut in contour, with firm, raised, infiltrated margins, and with offensive, greenish and blackish crusts, resembling oyster-shells. The cicatrices of

syphilis are elegant, smooth, delicate, superficial, circular, and, after pigmentation has disappeared, dead-white in color. Those of lupus are irregular, indurated, deforming, yellowish-white and reddish-yellow. Acquired syphilis is a disease of adult life; lupus commonly begins in childhood.

Patches of psoriasis are distinguished from the flat, exfoliating areas of lupus vulgaris by the relatively larger number of the former, by the nacreous lustre of the scales, the reddish-hemorrhagic surface beneath, and the sites of election of the patches, usually on the extensor faces of the limbs. Finally, in the lupous patch nodular elements may be determined, and under the diascope the peculiar reddish-brown color of the nodule becomes evident.

Lupus erythematosus is readily distinguished by its characteristics, including the absence of nodules, ulcers, and crusts; the superficial character of the morbid process, the scaliness, and the occasional symmetry of the patches. An intermediate form between lupus erythematosus and lupus vulgaris has been described, but most cases so classed probably belong to the type called by Leloir *Erythematoid Lupus Vulgaris*, in which nodules are temporarily absent. In all such cases the nodules of lupus vulgaris develop sooner or later and confirm the diagnosis. The two diseases, unfortunately somewhat similar in name, are distinct in character. Here, again, lupus vulgaris begins, as a rule, in childhood, while lupus erythematosus is a disease of middle adult life.

In acne rosacea, with a bulbous condition of the tip of the nose, the redness is vivid; and the telangiectatic complications, with the seborrhoic flux, are conspicuous points of difference from lupus vulgaris. There is, further, no ulceration and little scarring, and the patients have usually suffered from the disease only after arriving at maturity. The mucous surfaces are also spared.

The diagnosis of verrucous growths of tuberculous nature is to be made after an investigation of the history of each case, which often includes a history of contact with cadavers or persons capable of communicating the disorder. The epitheliomatous, warty growths on the dorsum of the hands of elderly persons are not to be confounded with tuberculous lesions. In the former there is commonly a history of longer existence of the wart, and no record of suspicious contacts; while a careful search will usually determine epitheliomatous metamorphoses over the cheeks or temples of the elderly man or woman with epitheliomatous warts on the hands. In the latter, too, the facial lesions are usually multiple, fatty-looking scales, thicker in one part than another, resembling those of a severe seborrhea, but which are removed with difficulty, and which then leave a bleeding surface beneath.

The greatest difficulty in diagnosis is in distinguishing between tuberculosis verrucosa cutis and blastomycosis. In the latter condition the process is more actively inflammatory; it spreads more rapidly; the patches are apt to be greater in number; the periphery

of the lesion has a more active, reddish halo, in which numbers of miliary abscesses are seen, and from which the organism of blastomycosis can be obtained for microscopic examination. The patch itself shows more evidence of moisture and suppuration, and in consequence several papillomatous as well as verrucous lesions are usually present. In any case, the demonstration of blastomycetes microscopically determines the diagnosis.

In the orificial cases it must be remembered that tuberculosis of the viscera is a probable coincident disease. The microscope usually is needed for an exact diagnosis.

In obscure cases of any variety, the tuberculin test should be employed (for details, see section on General Diagnosis), and if possible the Antiformin method used to examine for the bacillus. In many instances where the examination of sections has failed to reveal its presence this method has been successfully employed.

Treatment of Tuberculosis Cutis.—The general treatment of the patient is of paramount importance, and the rules laid down for the management of tuberculous patients apply to those suffering with the disease located in the skin. There is no specific internal medication. Several medicinal preparations have been used with benefit, largely on account of their tonic effect. Cod-liver oil, various preparations of iron and arsenic, the hypophosphites, and other preparations of this nature are often indicated. In London, thyroid extract has been given in cases of extensive tuberculous disease of the skin with apparent benefit. Probably the most important measures are those relating to diet and hygiene.

Patients of the tuberculous class manifest in the highest degree the beneficial effects of a change of residence and climate—to the seashore or mountains from the interior valleys or plateau-lands; or the reverse for those who reside by the sea. It is the change which seems to produce the greatest benefit. An abundance of pure air and a life permitting out-of-door exercise are of the highest importance. The thermal and other springs of several countries furnish resorts where the benefit received is proportioned to the salubrity of the climate rather than to the special advantages of the waters furnished. Unfortunately, a large number of the patients affected with lupus or scrofuloderma are impoverished inmates of public charities or applicants to dispensaries, where these aids in the management of their ailments cannot be utilized. But even in these cases, with the modern arrangements, an out-of-door life can be frequently realized.

The most satisfactory results in the treatment of lupus vulgaris are obtained with the Finsen light. Not only is the method successful in removing the disease in a large majority of cases, but the scars produced are much less disfiguring than those left by other methods, except the results obtained sometimes by radiotherapy, or in some of the circumscribed areas treated by Lange's plastic method.

Phototherapy has given the best results of any method yet employed.

Forchhammer,¹ in a statistical report based on 1200 cases of lupus vulgaris treated at the Finsen Light Institute between 1896 and 1906, gives the following results of the treatment: cures, 60 per cent.; under treatment, 18 per cent.; treatment discontinued, 11 per cent.; dead, 11 per cent. Of the total cured (721), 33 had been free from recurrence for ten years or more, 289 for from five to ten years, 306 for from two to five years, 93 for less than two years. In a further study, the subjects are divided into initial cases and inveterate cases. In the initial cases 76 per cent. were cured, while in the inveterate cases 51 per cent. were cured.

Phototherapy has also been used extensively by Sequeira, Morris, Leredde, Gastou, Stroebel, Lesser, and Schmidt, and a few in the United States, including ourselves. While this treatment, when properly carried out, stands at the head of the list, it is not a practicable one in this country, on account of the expense involved, and for the reason that it requires hospital facilities.

Radiotherapy has also been used in tuberculosis cutis by Schiff and Freund, Kummel, Hollond, Knox, Pusey, and a number of other observers, including ourselves. The chief disadvantage in the latter method is the telangiectasia which frequently follows in the scar. Much less time is required to relieve the lesions by this method than by that of phototherapy.

With radium the results are very much the same as those achieved with x-rays.

The thorn treatment employed by Unna gives excellent results. The thorns of the gooseberry bush are saturated in the German *liquor stibii compositus*, and one or more thrust firmly and deeply into each lupous nodule which it has been determined to attack. The base of each thorn is then cut off with a pair of fine scissors and the patch covered with a zinc-oxid plaster. When the thorns are cast off, a simple granulating ulcer is left, which in favorable cases heals without delay.

Holländer's hot-air treatment of lupus is accomplished by directing upon the lupoid tissue, through a metal tube of slender diameter, a stream of air at about a temperature of 300° C. The result is for the most part a destructive cauterization requiring complete anesthesia. The resulting scars may be formidable.

Solidified carbon dioxid may also be used on small patches of lupus vulgaris with good results. Extensive patches are not well handled by this method.

Boeck² recommended the following paste: pyrogalloli, resorcini, acidii salicylici, of each 7 parts; gelanthi and talci pulv., of each 5 parts; this made into a soft paste, which is applied by means of a

¹ Die Bekämpfung der Lupus Vulgaris in Dänemark, 1896-1911 (Proceedings of the sittings of the Lupus Congress of the German Central Committee—zur "Bekämpfung der Tuberkulose"—Berlin, April 21, 1911 (abstr. Brit. Jour. Derm., 1911, xxiii, : 338).

² Monatshefte, 1909, xlviii, p. 441.

spatula over the lupous patch and covered with a thin layer of cotton-wool. The paste dries quickly, and with the cotton-wool forms a permanent dressing, which is allowed to remain for a week or longer. White¹ employed this method in a number of cases with favorable temporary results, but recurrence followed. Doutrelepon² summarized his fifty years' experience with the treatment of lupus as follows: From a cosmetic point of view, no treatment is as satisfactory as the Finsen light. Surgical treatment has the danger of opening blood- and lymph-vessels, thus favoring the spread of the tubercle bacillus, and should be employed only in case of small lesions which can be totally excised. New tuberculin is strongly advocated. He suggests beginning with 1 milligram, gradually increasing the dosage every second day. For local treatment, 1 per cent. sublimate poultices are advocated. Pyrogallic acid has also been useful in his cases. Fibrolysin proved of value in softening lupous scars. Strauss³ used copper salts in the treatment of lupus by subcutaneous and intramuscular injections and by mouth with success. He often combined treatment with copper salts and iodomethylene blue.

Sequeira⁴ describes a method of treatment (Pfannensteil's method) of intranasal lupus by the internal administration of sodium iodid, combined with the local application of hydrogen peroxid, as follows: The patient is directed to take 45 grains of sodium iodid daily, divided into six doses. Each morning the nose is cleansed with a nasal douche, using a solution of sodium chlorid and boric acid, and after drying the cavity is packed with sterilized gauze, which is kept constantly saturated by the patient with a 2 per cent. solution of hydrogen peroxid. This is done by means of a pipette. Excellent results are reported with this method.

Savatard⁵ reports the disappearance of lesions of lupus vulgaris under daily applications of a 5 per cent. tuberculin ointment. The lesions disappeared without apparent reaction.

Bruck and Glück⁶ used with success a 1 per cent. aqueous solution of gold and potassium cyanate as an intravenous injection. From 1 to 3 c.c. of this solution in 50 c.c. of salt solution was injected every two to three days until twelve or more had been employed. A local reaction similar to that seen following tuberculin injections was noted.

Bernhardt⁷ reports good results in the treatment of six cases of lupus vulgaris by the combined use of salvarsan and tuberculin injections; the former given in doses of 0.3 gramme each month; the tuberculin injections beginning with 0.5 milligramme, gradually increasing to 15 milligrammes, repeating the injections every four or five days.

MacKee,⁸ in twelve cases of lupus vulgaris treated with tuberculin,

¹ Jour. Cut. Dis., 1910, xxviii, p. 532.

² Archiv, 1910, p. 191.

³ Deutsch. med. Wochenschrift, March 13, 1913, xxxix, No. 11, p. 503.

⁴ Brit. Jour. Derm., 1911, xxiii, p. 327.

⁵ Ibid., 1912, xxiv, p. 81.

⁶ Deutsch. med. Wochenschrift, 1913, lx, p. 57.

⁷ Archiv, 1912, cxiv, p. 401.

⁸ Jour. Cut. Dis., 1914, xxxii, p. 366.

obtained the following results: Three of the hypertrophic variety, without ulceration, recovered after from eighteen to twenty months' treatment; three of the ordinary non-ulcerating cases recovered after from eighteen months' to two years' treatment; a fourth of the same type was greatly improved; and a fifth of a similar type showed no improvement. Four cases of ulcerating lupus vulgaris failed to recover after two months' treatment. In three cases of tuberculosis verrucosa cutis improvement occurred in all. In scrofuloderma the results were disappointing.

In the earlier experience, using large doses of tuberculin, the results were disappointing and at times dangerous, but with the modern small and graduated dosage favorable reports are constantly being recorded.

A saturated solution of trichloroacetic acid applied on lupous nodules with a cotton swab has recently been successfully employed by Heidingsfeld.¹

Sodium phenate in saturated solution, suggested by Leslie Roberts,² has been employed by the author with promising results. This preparation induces local reaction, and is applied daily for several successive days until reaction occurs. The applications are renewed after the subsidence of each reaction.

Prognosis.—The prognosis of tuberculosis of the skin in all its manifestations is in the highest degree variable. Many patients affected with lupus vulgaris, even after the production of the severest grade of deformity, recover and without further local manifestations gain a degree of facial comeliness that is marvellous. The scrofulodermata in the same way are remarkably improved, in the majority of all cases, by skillful medical and surgical management. In other cases systemic tuberculosis develops after even a single tuberculous infection, and grave results may occur either early in life or after years of tuberculous involvement of the skin and other organs. Other things equal, the prognosis in tuberculosis of the skin, as compared with that of other organs, is relatively favorable. due to the sparsity of tubercle bacilli in most cutaneous lesions, the skin being exposed too largely to external influences to form a good field for development of new colonies of bacilli. Any form of tuberculosis of the skin, however, may result in systemic infection and death.

ERYTHEMA INDURATUM.

Synonym.—Erythème induré des Scrofuleux (Bazin).

Definition.—Erythema induratum is a chronic recurring disorder, usually involving the skin of the legs of young individuals, characterized by deeply situated nodosities and ulcerations.

It is probable that the disease as reported in the past represents three types: first, the common type described below, which is tuberculous in origin; second, an ulcerative process occurring at a more

¹ Trans. Amer. Med. Assoc., Sec. on Derm., 1914, p. 52.

² Personal communication.

advanced age and on other regions of the body than the site commonly selected, and which is more painful, more amenable to treatment, and is probably due to vascular disturbances and is not tuberculous;¹ and, third, atypical examples now classed with the sarcoids.

Symptoms.—The beginning of the disorder is marked by one or several deep-seated nodosities located in the hypoderm, which gradually extend to the surface and undergo necrosis, producing ulceration, or, after absorption, atrophy. They are usually bluish-red in color, though they may be a vivid red. They are painless, as a rule, though pain may ensue after ulceration has occurred. The disease commonly attacks the calves of the legs of girls from fourteen to twenty years

FIG. 186



Erythema induratum. (MacKee.)

of age. Crocker has seen it in a woman of over fifty, but she had suffered with the disease earlier in life. It has also been observed, though not often, in boys and men. The front of the leg may be involved occasionally, and also the thigh and even the upper extremities (Crocker and Galloway).

The nodules are hard, and can often be detected by palpation when not visible. They vary in diameter from one-half to one inch or more.

¹ Galloway, *Brit. Jour. Derm.*, 1899, xi, p. 206; Whitfield, *ibid.*, 1901, xiii, p. 386; *idem*, *Amer. Jour. Med. Sci.*, December, 1901; Galloway, *Brit. Jour. Derm.*, 1902, xiv, p. 199; Whitfield, *ibid.*, 1905, xvii, p. 241; Galloway, *ibid.*, 1913, xxv, p. 217.

Node-like patches may also be present. The lesions are symmetrical, and may be few, but in time a greater number develop. The ulcers are irregular, ill-conditioned, with puriform contents, and tend to heal slowly, leaving scars. At a given time, there may be present nodules, ulcers, atrophic areas, and scars, some of these being relics of former attacks.

The disease occurs, as a rule, in public practice and is comparatively rare. It has been observed in connection with tuberculides of the papulo-necrotic type; in patients having tuberculosis elsewhere in the skin;¹ and also in patients having tuberculosis in situations other than the skin.²

Etiology.—The affection occurs most frequently in the winter, and much more commonly in the female sex in the second decade of life. Washerwomen and shop-girls, who stand much, are liable to it. Its subjects often have a weak peripheral circulation, evidenced by cold, blue hands or a chilblain tendency. The tubercle bacillus, in the light of recent study, plays an important role in the type cases.

Pathology.—From the studies of Thibierge,³ T. Colcott Fox,⁴ Mantegazza,⁵ and others, the tuberculous nature of the disease seems well demonstrated, although inoculation experiments are usually negative and the presence of the *Bacillus tuberculosis* difficult to demonstrate. A granuloma with giant- and plasma-cells common to tuberculosis has been demonstrated repeatedly. Successful inoculations into guinea-pigs have been made by Gilchrist, Fox and Eyre, Thibierge, and Ravaut, and evidence is constantly accumulating which adds strength to the theory of the production of the common type of this disorder by the *Bacillus tuberculosis*. In a case of the non-tuberculous variety, Galloway found a granuloma in the deeper part of the corium and subcutaneous tissue. The cells were mononuclear plasma-cells, a very few polymorphonuclear, and a large number of giant-cells. He differentiates these giant-cells from those occurring in tuberculosis. Whitfield also calls attention to the points of distinction in the histology between these cases and the common type, found even in the presence of giant-cells.

Diagnosis.—Erythema nodosum and syphilis are the two diseases most likely to cause confusion in the diagnosis. From the former, erythema induratum is distinguished by its chronic course, its tendency to ulceration, the absence, as a rule, of pain, lack of fever, and other constitutional symptoms, the presence of scars, and its frequent association with other evidences of tuberculosis. From the gummatous syphiloderm, it is differentiated by the symmetry of the lesions, and by the absence of other evidences of syphilis; finally, it is not benefited by specific treatment.

¹ Fordyce, Jour. Cut. Dis., 1911, xxix, p. 444; MacKee, *ibid.*, 1913, xxxi, p. 568.

² Crocker, Dis. of the Skin, 3d ed., p. 812.

³ Annales, 1899, s. iii, x, 513.

⁴ Brit. Jour. Derm., 1900, xii, p. 383 (Report on the Tuberculides, presented to the Fourth International Congress of Dermatology and Syphilis).

⁵ Annales, 1901, s. iv, ii, p. 498.

In the major number of cases in which the tuberculin test has been employed, it has proved positive.

Treatment.—The general tonic treatment indicated in tuberculosis should be used in most cases. Rest in bed, with elevation of the limbs, is recommended. Before ulceration, bandaging should be practised, and local antiseptic dressings after this last has occurred. The disease has responded unusually well to treatment with tuberculin.¹

LICHEN SCROFULOSORUM.

Synonym.—Lichen Scrofulosus.

Definition.—This disorder, first described by Hebra (see his remarks before the German Surgical Society, Fourteenth Congress), is characterized by the occurrence of indolent papules, situated chiefly on the trunk, and occurring in tuberculous subjects. The lesions are millet-seed- to pinhead-sized papules, firm in consistency and flat topped. In color they vary from that of the normal skin to light or vivid red. The papules are occasionally surmounted by minute scales, rarely by an equally small pustule. At the outset the lesions are isolated. Later, they tend to arrange themselves in coin-sized patches. Often there is a crescentic outline formed by the aggregation of individual lesions. When evolution is accomplished, they are closely set together, the surface of the skin then being of a dirty, reddish-brown hue and covered with thin scales, which are readily detached. The course of the eruption is slow. Often the cutaneous symptoms persist for months without apparent change, awakening little or no itching, and are followed by involution, accompanied by slight desquamation and no cicatrices. There may be recurrence.

Etiology and Pathology.—In 99 per cent. of all cases observed in Austria, there was concomitance of the general symptoms of struma (evidenced by submaxillary, cervical, and axillary adenopathy, periostitis, or ulcerative dermatitis), with frequent complications, such as eczema of the scrotum. The disease was encountered in young tuberculous subjects between the periods of infancy and puberty, rarely after the twentieth year. Crocker² has noted its frequent occurrence in children in whom he suspected tuberculous pleurisy. Jadassohn³ believes that it is a disease of the tuberculous, and not of the cachectic generally, and obtained typical reactions in fourteen out of sixteen cases injected with tuberculin. He has seen the disease disappear after these injections. As to the question of its toxic or bacillary origin, opinion is divided. In favor of the former theory,

¹ Whitfield, *Brit. Jour. Derm.*, 1905, xvii, p. 241; Clark, *Jour. Cut. Dis.*, 1909, xxvii, p. 567; Fordyce, *ibid.*, 1911, xxix, p. 444; MacKee, *ibid.*, 1913, xxxi, p. 568.

² *Dis. of the Skin*, 2d ed., p. 448.

³ *Trans. of the Internat. Cong. of Derm. and Syph.*, London, 1896, p. 425.

Schweninger and Buzzi,¹ Fox,² Klingmüller,³ and others have seen a disease apparently identical with it produced by tuberculin injections. It has been suggested that the injections may have stimulated a latent tuberculosis into activity, but in the histological study of a case thus produced Porges⁴ found merely changes of an inflammatory character, with no evidence of a tuberculous structure. In a case of lichen scrofulosorum in a negro child, Gilchrist⁵ found a granuloma deeply situated, while the folliculitis which produced the clinical symptoms was more superficial.

According to Kaposi, the disease consists of an exudative infiltration of the pilo-sebaceous follicles and perifollicular tissue. Each papule represents, therefore, the orifice of a follicle, with an infiltrated perifollicular annex; and its apical scale or pustule is formed of a mass of epithelial debris or an inflammatory exudate. Porges found areas of tubercular foci composed of round, epithelioid, and giant-cells in the corium. The vessels showed perivascular inflammation, with cellular infiltration about the sweat-ducts. Jacobi,⁶ Wolff,⁷ and Pellizzari⁸ have been successful in finding the bacillus in lesions or in producing inoculation tuberculosis in guinea-pigs.

Diagnosis.—The disease is differentiated readily from papular eczema by the absence of itching. From the miliary papular syphiloderm it differs in that the lesions of the latter, even though grouped, are always individually distinct. The general symptoms, moreover, are strikingly different in the two diseases. Lichen scrofulosorum should not be confounded with lichen planus or pityriasis rubra pilaris.

Treatment.—The malady produces but little inconvenience, and, moreover, yields readily to therapy. Hebra advises cod-liver oil internally and externally. Crocker advises liquor plumbi subacetatis grains 15 (1.), thymol grains 5 (0.33), to vaselin 1 ounce (30.), to be applied externally, with the administration of cod-liver oil internally.

Prognosis.—The prognosis is favorable.

TUBERCULIDES (DARIER).

Synonyms. — Toxituberculides (Hallopeau), Paratuberculoses (Johnston).

Definition.—Under the title Tuberculides, Darier⁹ classed a number of cutaneous affections which appeared to have many characteristics

¹ Quoted by Brocq., 20th Century Medicine, iv, p. 359.

² Brit. Jour. Derm., 1900, xii, p. 384.

³ Ibid., 1904, lxix, p. 167. A résumé of his work and observations at the clinic of Professor Neisser. In 17 cases of lichen scrofulosorum his findings relative to tubercle bacilli were negative and animal experiments also failed. In a small proportion of the cases a tuberculous structure was present, but in the major part no suggestion of tuberculosis was noted. The result of this work strongly suggests the toxic rather than the local bacillary origin of the disease.

⁴ Archiv, 1903, lxvi, p. 401.

⁵ Johns Hopkins Hosp. Bull., 1899, x, p. 84.

⁶ Verhandl. der Deutsch. dermat. Gesell., Third Congress, 1891, p. 69.

⁷ Ibid., Sixth Congress, 1899, p. 486.

⁸ Trans. Internat. Cong. Derm. and Syph., London, 1896, p. 425.

⁹ Annales, 1896, s. iii, vii, p. 1431.

in common. These diseases, or rather cutaneous manifestations of disease, have, as a rule, been observed in individuals the subjects of tuberculosis in organs other than the skin, or who have hereditary tuberculous tendencies. Hallopeau and others have suggested that they are due not to the local action of *Bacillus tuberculosis*, but to the toxins floating in the circulation from a distant focus. Fox¹ says that if they are due to the local action of Koch's bacilli, they must be few in number, of little virulence, and readily destroyed. Darier included in this category *acne cachecticorum* or *scrofulosorum*, disseminated or agglomerated folliculitis, *acnitis*, folliclis, *hydrosadenitis destruens* or *suppurativa*, *granuloma innominatum*, and disseminated erythematous lupus (Boeck). Fox, in his report on the tuberculides to the International Congress in Paris, in 1900, included among others in the list *acne varioliformis*, necrotizing chilblains, lichen *scrofulosorum*, and *erythema induratum scrofulosorum* (Bazin). According to Fox, "the essential lesion of the group of tuberculides is a small, extremely indolent granuloma, tending to undergo central softening and necrosis, and thus leaving scars. They are bilateral and symmetrical. The great clinical variation depends upon the depth at which the derma is affected, the implication or freedom of the glandular apparatus, the bulk of the granuloma, the distribution and number of the lesions, and the absence or presence of pustulation or necrosis." The subjects of this disorder often have a feeble peripheral circulation and are usually not robust. Two or more of these various lesions have frequently been noted in the same patient: for instance, lesions of the folliclis type on the upper, with *erythema induratum* on the lower, extremities, or acneiform lesions with lichen *scrofulosorum*. A patient whose case was reported by Johnston² had lesions on the arms which Johnston termed "necrotic granuloma," and others on the limbs which he termed "indurated erythema." Darier reported a case in which tuberculosis was present in the lungs and elsewhere, with tuberculides of the type of *acne cachecticorum* on the body, folliclis on the knees and extremities, and a tuberculous gumma on the leg. Little³ showed a case before the London Dermatological Society with acneiform and gummatous tuberculous lesions present at the same time. Fox notes that large gumma-like lesions often are associated with acneiform symptoms elsewhere.

Symptoms.—These vary, as described above, according to the type of lesions present. In general, the disorders are chronic, the lesions deep-seated, beginning usually in the hypoderm or corium, extending into and involving the surface. They are at first colorless, later bluish- or brownish-red or lighter in shade. They may suppurate, forming a pustule in the centre of the lesion. The latter dries into a depressed crust, which, when shed, leaves a small cicatrix; or ulcera-

¹ Brit. Jour. Derm., 1900, xii, p. 383 (Report on the Tuberculides, presented to the Fourth Internat. Cong. of Derm. and Syph.).

² Philadelphia Med. Jour., 1899, iii, p. 443.

³ Brit. Jour. Derm., 1902, xiv, p. 352.

tion may occur, leaving a small, depressed scar; or the lesion, nodule, or papule may be absorbed, leaving some atrophy with pigmentation. The lesions often are grouped and appear in successive series. Different types show a predilection for different parts of the cutaneous surface. For example, lesions of the acnitis type select the face, and those of the folliclis type, as a rule, select the extremities. The lesions are generally painless and do not itch, and there may be a large number or only a few exhibited.

The above description applies to the group of papular and nodular tuberculides as a whole, while the following description of types is given for their proper identification in this group.

FIG. 187



Generalized tuberculide; small papular and verrucous lesions.

Acnitis.¹—This variety Crocker² describes under the title *Acne Agminata*. Here the lesions select chiefly the face. They occur in distinct groups in different regions, especially upon the cheeks below the eyes, the upper lip, the chin, and the forehead. The lesions are usually brownish-red in color, though many appear semitranslucent and almost colorless. They vary in size from that of a pinhead to that of a pea, and are firm to the touch, and occasionally the small papules or nodules are capped with a vesicle or pustule. The lesions are prone to remain for a considerable time, then undergo involution, leaving a small, pigmented scar, which gradually becomes less conspicuous. In some cases involution occurs rapidly when once initiated.

Folliclis.—In this variety the favorite sites are on the hands, forearms, feet, and legs, though the face may be attacked. The trunk

¹ Schamberg, Jour. Cut. Dis., 1909, xxvii, p. 14 (a study of acnitis with report of an extensive case).

² Dis. of the Skin, 3d ed., p. 1164.

seldom is affected. Here the lesions pursue a more rapid course, commonly completing their cycle in from four to six weeks. They usually are noted first as red spots, which later develop into vesicles or pustule-capped papules or nodules. They are firm to the touch and painless. The pustules dry into crusts, which reveal on exfoliation small cicatrices. While the lesions are usually discrete, patches may occur. The disease is chronic in its course. Barthélemy¹ reports a case lasting ten years, which had exacerbations, the patient never being entirely free. In the case of a patient examined by us, the affection had lasted for four years and appeared worse in the early autumn. This case illustrated the fact pointed out by Crocker, that the lesions on the fingers are more indolent and firm, and apparently have hard centres surrounded by a rim of pus. The disease occurs, as a rule, in persons having tuberculosis or with tuberculous antecedents.

A disorder very similar if not identical with folliclis is described under the title *Acrodermatitis Pustulosa Hiemalis* by Crocker.² His description, taken from three cases, is as follows:

"The lesions are excited or kept up by the cold, affect the hands only, especially about the knuckles and sides of the fingers, and take the form of indolent, indurated papulo-pustules, isolated and few in number at a time; but the disease as a whole persists by a succession of lesions throughout the winter and early spring.

"They begin as hard, brown, large-pinhead points, but appear later as if there was a 'thorn in the flesh.' If opened early, serum escapes, but later pus forms around the peg and the whole is situated on an elevated, inflammatory, pea-sized base. The centre is cast off, leaving a scar. Some of the indurated nodules do not suppurate."

A patient exhibiting lesions of this type on the hands and tuberculous glands in the neck was presented before the Chicago Dermatological Society by the author.

Acne Scrofulosorum.³—This type corresponds to the small, nodular tuberculide (Darier), and is more commonly seen in London than elsewhere.

This eruption occurs, as a rule, in patients suffering with tuberculosis of the glands or other forms of the disorder. According to Fox, the eruption is an indolent, small, papulo-pustular or acneiform one, sparsely disseminated, without grouping, and unaccompanied by subjective symptoms. The lesions occur on the external aspects of the limbs, more particularly the lower, and about the buttocks and the region immediately above. They appear successively or by subacute outbreaks. The papules are inflammatory, are situated about a hair-follicle, are acuminate, and capped with a small pustule, which dries up, and often shells out with a central follicular plug, leaving a cicatrice. On undergoing involution, the lesions flatten

¹ Quoted by Crocker, *Dis. of the Skin*, 3d ed., p. 1169.

² *Dis. of the Skin*, 3d ed., p. 350.

³ Colcott Fox, *Brit. Jour. Derm.*, 1895, vii, p. 341: On *Acne Scrofulosorum* in Infants.

like the chronic form, later becoming disseminated, and then may end fatally; the telangiectatic variety; and, finally, the variety described as lupus pernio.

Symptoms.—Discoid Variety.—The early lesion is usually exhibited as one or several rape-seed- to bean-sized, slightly elevated, reddish macules, which do not entirely fade under pressure, and are covered with a grayish or yellowish, and sometimes slightly greasy, adherent scale.

The primary lesion enlarges peripherally, and in the course of months or years may assume the size of a small coin or a large saucer. The patches are well defined in outline, of a color varying with the

FIG. 188



Lupus erythematosus of the face.

complexion of the patient and with the acuteness or type of the disease from a rosy-pinkish to a deep-purplish hue. The shape is usually circular, oval, or in figures representing combinations of these outlines, and it may be irregular from the junction of two or more progressing patches. Its border is red, firm to the touch, and distinctly elevated, and it not infrequently exhibits comedones or light, adherent scales. The centre is depressed, paler in color, and shows either adherent, yellowish-gray scales or a glistening, unbroken epidermis. Close examination will disclose in most cases dilated follicular openings, which may be plugged with dry sebaceous matter or horny epithelium. The scales vary in color, being at times of a

clear white or whitish-yellow, and again often, from concurrence of comedones, of a reddish or brownish tint. They are usually scanty and adherent, but may be abundant, and occasionally may be seen firmly fastened to the orifice of the excretory duct of a sebaceous gland by means of a horny projection from the under surface. In some cases the erythematous redness predominates; in others the crusted, seborrhea-like feature is more pronounced. In the latter there are seen at times patches exhibiting almost a pure type of seborrheic dermatitis of the face.

The disease may spread symmetrically over the nose and cheeks in a form that has been likened by Hebra to the open wings of a

FIG. 189



Lupus erythematosus (seborrheic type).

butterfly. As the borders advance, the centre not infrequently undergoes involution and may show typical scars even while the outer rim is actively progressing. When the disease undergoes general involution, both the centre and the border gradually become paler in color and less elevated. Some of the patches resolve without leaving a trace of their existence, but in most instances typical scars are left. These are indelible and characteristic. They are generally uniform and superficial, can be pinched up readily between the thumb and finger, are of a dull, whitish tint, and are rendered punctate in a

peculiar manner, suggesting the action of the engraver's tool in what is known as the "stippling" process. They are never pigmented, puckered, radiate, stellate, corded or deeply attached.

The disease is seen most frequently on the different parts of the face, ears, and scalp, but may occur on any part of the body. On the scalp small, irregular patches or larger areas may appear. There is here usually more infiltration and more pronounced scar-formation, but less color and less elevation of the border, than in lesions of the face. The dilated follicles and comedones are often pronounced. The alopecia which results is permanent. After involution of the lesion, a smooth, slightly depressed, delicate and atrophic scar remains. At times the scalp alone may be involved. On the hands¹ and feet the disease may occur in the usual form or as a persistent erythema with slight scaling, but it more commonly begins as a lupus pernio.

The mucous membrane may be involved, presenting reddened plaques with minute excoriations, or be partially covered with a whitish exudate or with punctate scars. The early lesion is ill defined, reddish-violet, and slightly infiltrated. Later the lesions present the marbled appearance due to scar-formation. On the tongue the papillæ are lost, and the area becomes reddened without infiltration. When the lips are affected, they have the appearance, as described by Dubreuilh, of having been painted with collodion, which has desquamated. The disease on the mucous membranes is not uncommon. Smith² found it present in approximately 28 per cent. of 56 cases.³

Subjective sensations are usually slight or absent, but some itching or burning may be present during periods of activity in the lesions. The disease is markedly chronic in its course, lasting in cases for a quarter of a century or longer, and throughout that time not interfering with the general health. Though the disease usually progresses by very slow extension of the border, it may, after remaining comparatively stationary for months or years, rapidly advance for a short period and then again remain stationary. These periods of rapid progression usually follow or are accompanied by a peculiar type of acute dermatitis.

Disseminated Variety.—The disease may occur in a diffuse form. As a rule, the lesions first appear on the face, but later they may develop on any part of the body, varying in size from that of a pinhead to that of a bean, and presenting characteristics similar to the beginning patches of the more common type. Occasionally, by peripheral extension and coalescence, large areas become involved. There are usually only moderate infiltration and scaling. The color is of a deep or purplish-red. At times, subjective sensations are severe and are exhibited as itching, burning, or tenderness. The ears, scalp, and

¹ Cf. paper by Dr. Hyde, with 35 tabulated cases in which the hands were affected (*Jour. Cut. Dis.*, 1884, ii, p. 321).

² *Brit. Jour. Derm.*, 1906, xviii, p. 59.

³ Kren, *Archiv*, 1907, lxxxiii, p. 13 (Report of 4 cases, with histology in 2, and review of literature of cases involving mucous membranes).

later the trunk and extremities, become involved in the process. At times the lesions closely resemble those of erythema multiforme, urticaria, acute psoriasis, and other cutaneous disorders. The patches may even be the seat of vesicles, pustules, or bullæ. This form of the disease is accompanied in most instances by well-marked systemic disturbances (arthritic, gastro-intestinal, febrile). In two cases of this type seen by the author, the cutaneous manifestations presented a typical multiform erythema symptom complex. Rarely the disseminated patches may assume the characteristics common to the chronic type. Such an example is recorded by Johnston.¹

In addition to this variety, there is an acute form, first described by Kaposi as *erysipelas perstans faciei*, in which the eruption begins in multiple symmetrical spots or patches, which, coming together, blend and fuse until the whole face assumes a deep, dusky-red hue. Later the hands become involved, and the eruption here takes the form of bluish-red patches in some cases, while in others a papular or purpuric form may be present. On other parts of the body the lesions are multiple and may resemble those of many different diseases, as in the former type. In all cases belonging to this group marked elevation of temperature, rapid pulse, and other evidences of systemic involvement are noted. Roberts² collected eleven cases, ten of which ended fatally. Albuminuria is common in the acute cases, and occurred in 50 per cent. of Sequeira's and Bailean's cases. MacLeod³ reported an instance of a case associated with nephritis, which terminated fatally.

Telangiectatic Variety.—This form is rare. Here points, spots, plaques, or large disks on the surface, chiefly of the face, usually well defined, present a rosy-reddish or deep-purplish color, which deepens under pressure. When examined with care, the color is seen to be due to dilatation of the cutaneous vessels. The surface may be either slightly edematous or infiltrated and correspondingly elevated. There is an absence of scaling and of dilated follicles, but typical scars not infrequently follow involution of this type of the disorder. The course of the disease in this form is slow and the condition may remain for years without change.

Lupus Pernio.—This is another unusual form, in which the lesions are exhibited on the fingers and toes particularly, but also on other parts of the hands and feet and on the pinna of the ear, beginning as a more or less persistent erythema type of pernio (chilblain). Like the latter disease, this erythema may disappear and reappear with the seasons for years, but eventually may persist and assume the discoid type.

Etiology.—The disease is more common in women than in men, the ratio being two-thirds of the former to one-third of the latter, and

¹ Jour. Cut. Dis., 1912, xxx, p. 96.

² Brit. Jour. Derm., 1911, xxiii, p. 167 (records such a case and discusses ten collected by Pernet (Thèse de Paris, 1908)).

³ Ibid., 1908, xx, p. 162.

usually appears first in the third decade of life, in this particular presenting a contrast to lupus vulgaris. It may, however, first develop in childhood, middle life or old age. We have seen several instances in children. Stowers,¹ Crocker,² Galewsky,³ and others describe the disease occurring in children, and in these analyses girls were in the majority.

Lupus erythematosus may follow dermatitis seborrhoica, acne, variola, erysipelas, vesication with cantharides, undue exposure to the sunlight, or traumatism from any cause. It may be associated with chilblains;⁴ with Raynaud's disease;⁵ with symmetrical gangrene;⁶ with erythema iris;⁷ and it is sometimes seen in association with lupus vulgaris.⁸ It may appear where the curette has been employed in the case of a patient with a characteristic lesion on the face. It occasionally develops on portions of the face and hands which have been subject to recurrent attacks of pernio; and it is generally accepted that enfeebled circulation and local irritation are prominent causal factors. By an increasing number of writers the disease is considered a chronic inflammation due to a toxic infection, the exact nature of which is not known. Galloway and MacLeod⁹ believe that lupus erythematosus, like erythema multiforme, may be due to toxins arising from various causes. The association of the disease with multiform erythema is frequently observed. The relation of lupus erythematosus to tuberculosis has been a much disputed question, and although lupus erythematosus has none of the essential characteristics of a local tuberculosis, it occurs not infrequently as a dermatosis of the tuberculous. Besnier was the first to call attention to the fact that lupus erythematosus was in many instances associated with general or local tuberculosis. Cases in which this association occurred have been reported by a number of observers, and Boeck¹⁰ records 42 cases of the common discoid type, in 28 of which he found evidences of present or past tuberculosis. Roth¹¹ collected records of 250 cases of lupus erythematosus, in 185 of which evidence of local or general tuberculosis could be obtained. Sequeira and Balean¹² found the discoid variety associated with tuber-

¹ Brit. Jour. Derm., 1908, xx, p. 236.

² Ibid.

³ Archiv, 1907, lxxxiv, p. 193 (abstr. Brit. Jour. Derm., 1908, xx, p. 26).

⁴ West, Brit. Jour. Derm., 1907, xix, p. 448; Perry, *ibid.*, 1896, viii, p. 223; Adams, *ibid.*, 1903, xv, p. 287.

⁵ Pringle, *ibid.*, 1905, xvii, p. 306; Hartzell, Amer. Jour. Med. Sci., cxliv, p. 793; Engman and Mook, Interstate Med. Jour., April, 1909, p. 267.

⁶ Dawson (Brit. Jour. Derm., 1911, xxiii, p. 182) reported a case with lesions on the face, ears, scalp, and backs of the hands and fingers, associated with symmetrical gangrene of the fingers, tip of the nose, and ears.

⁷ Sequeira, Brit. Jour. Derm., 1910, xxii, p. 237.

⁸ Kyrle, Archiv, 1909, xciv, p. 309; MacKee, Jour. Cut. Dis., 1913, xxxi, p. 56; Roberts, *loc. cit.*; and others.

⁹ Brit. Jour. Derm., 1903, xv, p. 81: "Erythema Multiforme and Lupus Erythematosus: Their Relationship to General Toxemia;" and *ibid.*, 1908, xx, p. 65: "The Relationship of Lupus Erythematosus and Erythema Multiforme; with an illustrative case." (Complete discussion of the subject with literature and conclusions.)

¹⁰ Archiv, 1898, xlii, p. 71.

¹¹ *Ibid.*, 1900, li, p. 3

¹² Brit. Jour. Derm., 1902, xiv, p. 367.

culosis in 18 per cent., and that there was a history of tuberculosis in the family in about 40 per cent. In the disseminated form, the presence of tuberculous disease was noted in 70 per cent. of the patients, and there was a history of tuberculosis in the family in 80 per cent. Pick,¹ after studying the effects of tuberculin injections in 29 cases, concluded that lupus erythematosus discoides is not a manifestation of tuberculosis.² Acid-fast bacilli have been found in tissue of lupus erythematosus treated by the Antiformin method by Arndt, Hidaka, Spiethoff, and Friedlander. Successful animal inoculations relative to tuberculosis have been made from cases of lupus erythematosus by Gougerot, Ehrmann, Reines, and Block and Fuchs.

Lupus erythematosus is frequently associated with varieties of tuberculosis of the skin. Roberts³ quotes the case of a young woman twenty-five years of age suffering with tuberculous glands of the neck, lupus vulgaris of the face, and lupus erythematosus of the fingers. Kyle⁴ reports the occurrence of lupus erythematosus and lupus vulgaris in the same patient. Many other instances could be quoted. The author has in several instances seen lupus erythematosus of the discoid type associated with glandular enlargement of the neck. Similar cases are recorded by Sequeira,⁵ and others. Pringle⁶ believes that the connection between lupus erythematosus and tuberculosis is very close. Occasionally, disastrous results may follow the injection of tuberculin in cases of lupus erythematosus.⁷

Tuberculosis can thus be accounted an important factor in the etiology of lupus erythematosus, but that it is the whole cause, or even an essential factor in most cases, has not been demonstrated. It is associated more frequently with the disseminated than with the discoid form of the disease.

From the evidence produced, it would appear that the disease is of toxic origin, the nature of which is unknown, but probably from various sources. External irritation and local injury furnish exciting causes for the localization of the process, and circulatory changes play an important part.

Pathology.—Lupus erythematosus has been studied carefully by a number of observers, but, unfortunately, they do not agree either in their histological findings or in their conclusions based upon the latter. In the ordinary discoid variety, it may be said that the chief changes are found in the upper half or third of the corium in the form of a dense infiltration of small round cells of embryonic type, a small proportion of which is probably the result of proliferation of the

¹ Archiv, 1901, lviii, p. 358 (with bibliography).

² For discussion on the relationship of lupus erythematosus to tuberculosis, see article by Freshwater, Brit. Jour. Derm., 1912, xxiv, pp. 57 and 99; Friedlander, Jour. Cut. Dis., 1911, xxix, p. 417 (with extensive bibliography); Arndt, Berlin klin. Wochenschrift, 1910, xxix, p. 1360; Block and Fuchs, Archiv, 1913, cxvi, p. 742 (an extensive review of the literature concerning the etiology of lupus erythematosus).

³ Loc. cit.

⁴ Brit. Jour. Derm., 1913, xxv, p. 197.

⁵ Pringle, *ibid.*, p. 197; Saville, *ibid.*; and Ravogli, Jour. Cut. Dis., 1915, xxxiii.

⁶ Loc. cit.

⁷ *Ibid.*

fixed cells of the part. The infiltration varies greatly in extent and in density in different types of lesions, but is most pronounced along the course of the vessels. It is often found in slight degree in the deeper parts of the corium and subcutaneous tissue; but it nowhere forms nodules as in lupus vulgaris; there are no giant-cells; and there is no degeneration of a mass of cells, as in the latter disease. Individual cells here and there undergo a granular and fatty or colloid degeneration, disappear by absorption, and are replaced by new cells. The connective-tissue fibers are destroyed in the same way. Many of the vessels are seen to be greatly distended and choked with red blood-corpuscles, others show a proliferation of their walls, and in some cases an obliterating endarteritis. Diffuse or localized hemorrhages are found in the upper part of the cutis. The sebaceous glands are at first hypertrophied, affected with hypersecretion, and become filled with cells and abnormal sebaceous matter. Later both they and the ducts of the coil-glands may become infiltrated, undergo degeneration, and disappear, leaving the peculiarly punctate form of scar characteristic of the disease.

The epidermal layers are involved secondarily. They become atrophied, and the interpapillary depressions of the rete as well as the papillæ are largely obliterated.

Fordyce and Holder¹ investigated a number of cases of the discoid type and describe a peculiar blocking of the capillaries with blood-cells, which they believe to be the primary change. They divide the factors making up the histological complex into the round-cell infiltration, the peculiar degenerated condition of connective tissue, and the secondary atrophy. They find that the commonly described fatty and granular degeneration is not characteristic of the process. Schoonheid,² from a histological study of twelve cases, concluded that lupus erythematosus is a chronic inflammatory process, and describes a peculiar degeneration and destruction of the elastin, which he believes to be the immediate cause of the superficial scars. Warde³ regards the profound stasis in the lymph- and blood-channels as the most important feature in the histology of the disease. Höllender⁴ considers the pathologic process to have its origin in the glands of the skin.

Robinson,⁵ after examining a number of cases and reviewing the published reports of others, states that the primary lesion, which may be seated in any part of the corium, is focal in character, and when fully developed constitutes a new-growth, which is reticular in structure and closely connected with the lymph-channels. He concludes that "lupus erythematosus is a chronic inflammatory disease of the cutis with special histological characters, as shown by the changes in the blood-vessels, by reticular tissue, and by the presence of mononuclear and the absence of polynuclear cells in the cell-infiltration; and that

¹ New York Med. Record, 1900, lviii, p. 41.

² Archiv, 1900, liv, p. 163.

³ Brit. Jour. Derm., 1902, xiv, p. 447.

⁴ Berlin klin. Wochenschrift, 1903, xxx.

⁵ Trans. Amer. Derm. Assoc., 1898, p. 70.

these changes must depend upon the presence of a poison generated *in loco*. In other words, lupus erythematosus is a local infective process—a granuloma.”

Roberts¹ found in an acute case of the disseminated variety the following histological changes: The vessels and lymphatics of the corium were dilated, and surrounded by perivascular cell-infiltration, consisting of mononuclear leukocytes, connective-tissue cells, and a few small and large plasma-cells. The reticular layer of the corium was rarefied. Elastin was present. There was atrophy of the epidermis.

In mucous membranes, Pautrier and Fage² describe the histology as follows: The changes in the region of the lip showed an irregular thickening of the epidermis and cornification of the mucosa. In the corium there occurred a cellular infiltration, consisting of lymphocytes and connective-tissue cells, a considerable number of plasma- and a few mast-cells. There was dilatation of the blood-vessels. The collagen and elastin were normal, except in the areas of densest infiltration, where they were rarefied. The lesions on the tongue showed acanthosis. In the corium the vessels were dilated, and there appeared to be newly-formed capillary loops, and in addition a superficial cellular infiltration, with lymphocytes, connective-tissue cells, and a few plasma-cells.

Diagnosis.—When lupus erythematosus is present on the face the picture presented is usually so characteristic that the disease is there recognized with ease. When the hand and other portions of the body are involved, the diagnosis is somewhat less readily established. In the hand the disease has a predilection for the dorsum, and invades the palm usually only by extension to it from behind.

From lupus vulgaris, erythematous lupus may be recognized by its occurrence originally at a later period of life; by its greater tendency to symmetry; and by the absence of nodules, ulceration, and extension to the deeper portions of the skin or underlying structure. Cases undoubtedly occur in which the diagnosis is difficult, as in the type called by Leloir *lupus vulgaris érythématoïde*. But, as in all cases of lupus vulgaris typical nodules appear sooner or later, the diagnosis can eventually be established.

In eczema there is usually some history of moisture; in erythematous lupus, rarely. In eczema, also, the itching is a more persistent and distressing symptom; but the acuteness of even chronic eczema, as compared with lupus erythematosus, will suffice to distinguish the two diseases. From dermatitis seborrhoica, however, the diagnosis may be difficult and may have to depend on a therapeutic test, the latter disease disappearing under appropriate treatment. Psoriasis is rarely, if ever, limited to a single patch on the face; it is also characterized by more lustrous and more readily exfoliating scales. Its patches are, furthermore, uniformly well covered with scales, and are of equal flatness in all parts; while those of lupus erythematosus are

¹ Loc. cit.

² Annales, 1909, x, p. 673.

irregularly squamous, the scales being often clustered at the orifices of the ducts of the sebaceous glands, while the rim of the patch is elevated and the centre depressed. From *pernio* the diagnosis sometimes can be made only after determining whether the lesions disappear during the warm season, as in *pernio*, or persist, as in *lupus erythematosus*.

In *acne rosacea* there are marked telangiectases and papulo-pustules or nodules, which are not found in erythematous *lupus*. In *trichophytosis corporis* there may be a clearing, but never a cicatriform, centre of the circular disk. The circular serpiginous syphilodermata of the face occur usually with other manifestations of lues, are characterized by greater infiltration and a more rapidly progressing border, formed by the coalescence of individual papules, or nodules; and in most cases the syphilitic lesions exhibit distinct signs of ulceration. The not infrequent modification or masking of a patch of the disease by an acute or subacute dermatitis (often seborrhoic in character) should be borne in mind.

Treatment.—The internal treatment of this affection is not highly satisfactory. Frequently, none is indicated or required. The general health of the individual should be carefully investigated and all defects remedied, if possible. For the local or discoid variety, iodoform in 1 grain (0.06) doses (Whitehouse); ichthyol in from 2 to 5 mms. (0.13 to 0.33); salicin, 10 to 15 grains or more three times daily, and quinin in increasing dosage are all of value. Other preparations, such as potassium iodid, mercuric iodid, starch iodid, arsenic, ammonium carbonate, and sodium salicylate, have their advocates, but are only beneficial in certain instances.

The number of remedies recommended for local use in *lupus erythematosus* is enormous. White,¹ in reviewing the subject, has enumerated some fifty of those most promising, at the same time calling attention to the fact that *lupus erythematosus* is no exception to the rule that "the curability of a disease is in inverse ratio to the length of the list of the means recommended for its cure." He admits that our treatment of this disease is wholly empirical and not very hopeful. Unna² attempts a rational form of treatment based on his conception of the etiology and pathology of the disease and of the action of certain remedies. He calls attention in particular to the fact that, while the epidermis is exceedingly dry and hyperkeratotic, the cutis is markedly edematous and the seat of dilated lymph-spaces and channels, and emphasizes the dangers of stimulating a dry, indolent process into an active dermatitis.

For convenience, the remedies used may be divided into three classes: the soothing and astringent, the stimulating, and the destructive. The choice of remedies will depend largely upon the type of the disease and on the character of the individual skin. In the acute, inflammatory, or vascular type, soothing remedies alone should be

¹ Jour. Cut. Dis., 1898, xvi, p. 457.

² Ibid., p. 465.

used, and on a skin which reacts readily to stimulation stronger remedies are not allowable. Nor should it be forgotten that the indolent forms of the disease not infrequently under treatment become acutely inflamed, and call for the temporary use of soothing measures. Inasmuch as the affection is one the involution of which occasionally is accomplished under the influence of mild topical applications, and is succeeded very rarely by grave sequels, the simpler measures should always be adopted first. The zinc-oxid and aqua-calcis lotion, also the calamine lotion, are usually beneficial. For continued stimulation and astringent effect, the lotio alba may be employed, the formula being as follows:

R—Zinci. sulphat.,		
Potassi sulphid.,	aa	3ss; 2
Alcoholis,	f 3iij;	12
Aq. rosæ,	f 3iijss;	105
Sig.—To be diluted as required for external use.		M.

In case the lotions are too dry, a mild salicylic acid or sulphur ointment may be employed temporarily. These remedies are employed particularly in the seborrhoic variety of the disease. Frequently, much can be accomplished through protection and compression of the surface by the application of collodion, the glyco-gelatins, celluloid cream, or tragacanth jelly. Unna recommends especially for irritable cases:

R—Ichthyol.(vel ichthyol. sulfon.),	3ss;	2
Collodii,	3v;	20
		M.

For more indolent cases:

R—Saponis mollis,	3ss-ij;	2-4
Collodii,	3v;	20
		M.

To the latter may be added one or two parts of salicylic acid.

Unna recommends also gelanthum as a substitute for collodion in the above formulæ, for though it does not produce as much compression as the latter it is more convenient, in that it may be washed off at any moment with warm water. A favorite formula with him is potass. hydroxid., 1; gelanthum, 1000.

Stimulation of the areas must always be produced with great care, on account of the possibility of causing spread of the disease. In indolent cases, this may be done by the use of sulphur, in the strength of from 2 to 20 per cent.; salicylic acid in the strength of 1 to 5 per cent., or ammoniated mercury, resorcin, ichthyol, or tar. The mild salicylated soap-plasters or plaster-mulls containing the above remedies in small quantity may be used where a moderate amount of stimulation is desired. Good results follow the use of green soap applied as a paste or in the form of tincture. It not only cleanses the patches of scales, but also stimulates the surface, often to the extent of producing a reparative process. When decided irritation of the parts is induced, the soap should be discontinued and soothing treat-

ment alone employed. The application of hot water for a few minutes daily is frequently of value. After drying, the surface should be dusted with powder.

A combined internal and external treatment has been devised by Höllender,¹ the medicaments used being quinin and tincture of iodine. His method is as follows: Seven and one-half grains (0.5) of quinin or quinin sulphate are given three times a day. After taking, each area of the disease is thoroughly painted with tincture of iodine. After five or six days a rest from treatment is taken until the scale from the application has peeled off. Several courses of treatment as above may be needed, though sometimes one suffices. Höllender regards his method as specific and of value in differential diagnosis. Excellent results have been reported by many observers. Before applying the treatment the patient should be tested for any idiosyncrasy against quinin.

The treatment of lupus erythematosus with phototherapy, radiotherapy, radium,² carbon-dioxid snow, and liquid air has been successful in a number of cases, but with all of these methods great care is necessary to avoid producing injurious results in this erratic disorder. After the employment of all the methods above mentioned recurrences happen, even when good results have apparently been achieved. In properly selected cases they may all be used with benefit. X-rays have given best results in those cases having a marked seborrhoeic development; and carbon-dioxid snow and liquid air in those cases of discoid type that have become stationary and are indolent in character. The high-frequency current, also, has many supporters, but, as a rule, it is, like the above mentioned measures, of value only in certain cases.

In indolent patches, where decided stimulation or a superficial destruction of tissue is desired, the carbon-dioxid snow is of great value; or, in the place of that, the stronger salicylated soap-plaster and plaster-mulls are recommended, or creosote, phenol, chrysarobin, pyrogallol, silver nitrate, lactic acid, or Fowler's solution may be used. Two drachms (8.) each of iodine and potassium iodid, mixed with 4 drachms (16.) of glycerin; or equal parts of chloral, tincture of iodine, and phenol, are recommended highly. These stronger remedies, however, are to be used with great caution and only in indolent cases, and then only after milder measures have failed to produce good results.

The treatment by ionization has been successful in the hands of many.³

Many authors report results of treatment with tuberculin. This method is not recommended, and dangerous results have followed its employment in this disease, whether from the standpoint of diagnosis

¹ Berlin. klin. Wochenschr., July, 1902.

² Simpson, Trans. Amer. Med. Assoc., Derm. Sect., 1914, p. 289.

³ Hartigan, Brit. Jour. Derm., 1908, xx, p. 81; Davis, *ibid.*, 1909, xxi, p. 325; Crockett, *ibid.*, p. 293; and others.

or treatment. The local application of tuberculin in the form of inunction has also been followed with negative results.

Prognosis.—A favorable opinion with respect to the future of the disease can never be given safely, on account of the capricious nature of the disease and the constant recurrences and relapses which characterize it. In the fixed or discoid type, the general health and comfort of the patient suffer rarely. The affection is capricious in its course, and may on occasions, after long periods of persistence, rapidly improve under the simplest treatment. Spontaneous involution, with disappearance of all symptoms, is reported in some cases. Its tendency to the production of persistent scars should always be remembered in formulating a prognosis. Numerous instances of the development of carcinoma upon the scar of lupus erythematosus have been reported.

MULTIPLE BENIGN SARCOID (BOECK).

Synonyms.—Benign Miliary Lupoid (Boeck), *Sarcoides noueuses et nodulaires* (Darier).

The disorder described under the above title was first recorded by Boeck.¹ Cases of this rare disease have been reported in America by Gottheil,² Pollitzer,³ G. H. Fox and Wile,⁴ and Howard Fox.⁵

Definition.—The disease occurs in several forms, and is characterized by the presence of nodules (both cutaneous and subcutaneous), papules, and plaques of infiltration, situated about the face, arms, and lower extremities, running a benign course and terminating, after resolution of the lesions, in atrophic and scar-like areas; and, finally, by its response to arsenical medication.

Its nosological position is undetermined. By some authors it is regarded as a tuberculide, and the histology of many cases appears to warrant this assumption; while other cases conform more closely to the lymphodermata. Darier,⁶ in an extended study of the subject, subdivides the reported cases into four groups, as follows: (1) multiple benign sarcoid or miliary lupoid (Boeck); (2) subcutaneous sarcoid (Darier-Roussy); (3) sarcoid nodularis of the extremities, the type resembling erythema induratum (Bazin); (4) sarcoid of Spiegler-Fendt, a type histologically resembling lymphoderma and not showing a tuberculous architecture.

There is sufficient similarity, both clinically and histologically, between the types to warrant their grouping under a single head, and the picture presented is characteristic and justifies its consideration as an entity.

¹ Jour. Cut. Dis., 1899, xvii, p. 543.

² Ibid., 1902, xx, p. 400.

³ Ibid., 1908, xxvi, p. 15.

⁴ Ibid., 1911, xxix, p. 375. In this article a case is described clinically and histologically, and the entire subject thoroughly analyzed and bibliography appended.

⁵ Ibid., 1914, xxxii, p. 124. A case resembling lupus erythematosus.

⁶ Monatshefte, 1910, I, p. 419.

ADDITIONAL REFERENCES: Sequeira, Brit. Jour. Derm., 1911, xxiii, p. 85; Adamson, ibid., 1912, xxiv, p. 393; Unna, Jr., Derm. Woch., 1912, lv, p. 1203; Sweitzer, Trans., Amer. Med. Assoc., Derm. Sect., 1914, p. 262; Pautrier, Annales, 1914, v, p. 344.

Symptoms.—The type originally described by Boeck occurs as nodules, papules, and infiltrating plaques. The nodules may be few or numerous; may be firm and elastic; are round, oval, or irregular in shape; and are of a reddish or purplish color. At times they show delicate peripheral telangiectases, and occasionally slight scaling. The papules may be few or very numerous (Hallopeau and Zych). The plaques are similar to the nodules, and occupy the entire thickness of the skin, being movable over the underlying structures. As a rule, they are much larger than is apparent from inspection. The lesions occur, as a rule, upon the face, back of the shoulders, and extensor aspects of the arms.

The color of the early nodules is bright red, later becoming darker, and finally a yellowish-brown. Under pressure, the nodule is seen to be composed of grayish-yellow foci, which characteristic suggested the name of "miliary lupoid." On the face the lesions have a peculiar appearance, with a blue centre and a yellowish border. The nodules finally disappear, leaving, as a rule, atrophy and distinct scar-formation, which may be white on the face, yellow on the back, and darker at the periphery of the lesions on the legs. Occasionally, the regional glands are swollen, but, as a rule, they are not involved. Exudation and ulceration never take place. The disease runs a benign course and responds to treatment with arsenic.

A case demonstrated by the author at the thirty-eighth annual meeting of the American Dermatological Association presented sarcoid tumors on the face and neck of a female patient, who had suffered with lupus erythematosus for twenty-three years before the beginning of the sarcoid. The lesions in this case were plaques and nodules involving the entire skin, movable, indurated, of irregular contour, varying in size from that of a coffee-bean to a large nut, bluish- or brownish-red in color, and painless. On undergoing involution, which occurred spontaneously, distinct atrophy was left. New lesions appeared as the older ones cleared up. The duration of the sarcoid at the time of presentation was three years.

In the second group, described by Darier and Roussy¹ as subcutaneous sarcoid, the lesions are described as developing slowly, and usually without subjective sensations. The nodules are deeply situated, rounded or oval in contour, and sometimes occur in chains following the blood-vessels. They vary in size from that of a grain of lead to a large nut, and in number from two to twenty or more. They are found chiefly in the region of the flanks, hypochondrium, loins, and shoulders, and are imperfectly symmetrical. There is no disturbance of the general health. The lesions commonly develop to a certain size and remain stationary.

The third group described by Darier includes those cases which resemble clinically erythema induratum of Bazin. The cases of this group are more common than those of either of the two first-mentioned

¹ *Archiv. de Méd.*, 1906, xviii, p. 1.

types. They occur chiefly in adult women, and present hazel-nut-sized, reddish or purplish tumors, the infiltrations on the arms and legs occupying largely the extensor surfaces. In these cases the disease runs a chronic course. Occasionally, ulceration supervenes.

In the fourth group, Spiegler-Fendt type, the lesions occur as multiple tumors situated in the skin, usually on the trunk, and are of a lilac or deep-red color. They are painless, and at times may be of large size. Their course may be rapid or slow, and, like the other types, they respond to arsenical medication. Spiegler's case resulted in death after metastases.

Mixed cases occur in which the lesions belonging to one or more of the above types may occur in a single patient, and it appears to be a fact that certain cases of atypical erythema induratum have in reality been sarcoid tumors.

Etiology.—The chief factor has been to determine the rôle played by the tubercle bacillus. Darier considered the disease to be a tuberculide. In a few instances, tuberculosis has been reported in inoculated animals, and tubercle bacilli have been demonstrated in one case. These have all belonged to the group described as resembling erythema induratum. Pautrier¹ suggests that certain cases of sarcoid, particularly of the Darier-Roussy type, owe their origin to syphilis. The major number of cases have occurred in females.

Pathology.—In the Boeck type, sharply circumscribed, deeply situated nodules occur, which are separated from one another by connective-tissue septa. The cellular infiltration is composed chiefly of epithelioid connective-tissue cells. The nuclei are large and vesicular, less deeply stained, and show distinct nucleoli. In some instances true giant-cells of a sarcomatous type are seen. In early stages, a few mast-cells are present, and occasionally leukocytes are detected. The infiltration apparently develops from the perivascular lymph-spaces, but in certain foci appears to be derived from the corium itself, independent of the vessels. A marked tendency throughout the entire corium to connective-tissue-cell proliferation is noted. The elastic fibers are absent throughout the new-growth. In the surrounding tissue they are normal. Dilatation of the capillary loops of the papillæ occurs, which accounts for the bluish color in the network in the centre of the older patches. Changes in the epidermis are purely secondary. Immediately over the nodules, the interpapillary prolongations are obliterated from pressure.

In the second type, the histological picture resembles that described above, but presents a greater number of giant-cells and a greater resemblance to the picture seen in tuberculosis. The infiltration is more diffuse, and the nodules are composed of epithelioid cells, lymphocytes, and giant-cells.

The histopathology of the third group conforms closely to that found in tuberculosis, though tubercle bacilli have been demonstrated in only one case.

¹ *Annales*, 1914, v, p. 344: *Sarcoïdes and Syphilis*.

In the fourth type there occur aggregations of round cells enclosed in a capsule of connective tissue. Giant-cells and epithelioid cells occur in small numbers. In this type, the condition resembles the lympho-granulomata more closely than the tuberculides. In all types there is a connective-tissue new-growth situated in some portion of the corium, produced by some as yet undetermined factor.

Diagnosis.—The cases are to be distinguished from leukemia cutis, nodular lupus erythematosus, and erythema induratum of Bazin. By a reference to the symptoms characteristic of these latter diseases, a differential diagnosis is usually possible, although a microscopic examination is generally necessary. The history of the cases of the various types of sarcoid and their characteristic histopathology distinguish them from other disorders.

Treatment.—Arsenic appears to be a specific. Under this therapeutic agent the lesions are gradually absorbed, leaving atrophy and pigmentation. Darier reports successful treatment with x-rays, calomel, and tuberculin. In Unna's¹ case, lesions treated locally with ichthyol underwent involution more rapidly than those untreated.

Prognosis.—As a rule, the prognosis is good, both as regards life and probable disappearance of the lesions under treatment. Some cases have terminated fatally, but in these other factors were interposed.

SYPHILIS.

Synonyms.—Lues Venerea, Morbus Gallicus, Pox, "Bad Disorder." Fr., Vérole; Ital., Sifilide; Ger., Lustseuche, Krankheit der Franzosen.

Definition.—Syphilis is a chronic, constitutional, infectious and contagious disorder, hereditary or acquired, which may attack any tissue or organ of the body, is characterized by symptoms referable to the part attacked, and is produced by the *Spirocheta pallida* or *Treponema pallidum*.

In acquired syphilis, the first evidence of its existence is the initial sclerosis or chancre, which appears about twenty-one days after infection. This interval, ordinarily described as the first incubation period, may extend over a period varying from ten to thirty days. In about six weeks after the beginning of the primary lesion, more or less generalized cutaneous manifestations appear. This last-mentioned interval, usually described as the second incubation period, may extend over a period of from four to twelve weeks. During this period there is gradual enlargement of the superficial lymphatic glands.² Those nearest the early lesion enlarge first; later others are involved. Chief among these are the inguinal, the epitrochlear, the anterior and posterior cervical, post-auricular, occipital, submaxillary, and axillary groups. Their enlargement varies, but usually they are from pea-

¹ Derm. Woch., 1912, lv, p. 1203.

² Friedländer, Jour. Cut. Dis., 1912, xxx, p. 14: The value of Lymphatic Gland Examination as a Factor in the Diagnosis of Syphilis.

PLATE XXIII



Miliary Papular Syphiloderm.

nut-sized, hard, painless, indolent, freely movable, and with no tendency to break down or suppurate. The regional adenopathy in association with extragenital chancre may be marked; the glands, especially the submaxillary, when the primary lesion is on the face, becoming as large as a small egg. They remain enlarged during the early stages of the disease and finally undergo a fatty metamorphosis, leaving small fusiform enlargements. In the late stages, adenopathy is not important from a diagnostic view-point.

During this period the general condition of the patient may exhibit both subjective and objective phenomena—anemia, and in certain cases even chloroanemia; wandering pains, substernal or about the articulations; a cachectic appearance; a special irritability of the skin and mucous membranes; and occasionally a well-marked febrile process, the so-called syphilitic fever. Careful examination at this time may also reveal changes in the tonsils and thyroid gland. The skin may exhibit icteric symptoms as the result of hepatic disturbances; albumin may temporarily appear in the urine; pains in the head, limbs, and other parts of the body may produce distress even of a severe grade; the joints may become painful and swollen; and the blood examination reveals a certain grade of anemia with leukocytosis;¹ all of which point to the fact that a general intoxication is in more or less rapid evolution. In many patients the major portion of the above described symptoms pass unnoticed or are absent. A moderate elevation of temperature, accompanied by cephalalgia and slight indisposition, not infrequently occurs.

Chancre (*Initial sclerosis, Indurated chancre, Primary sore, Hunterian chancre*).—Every attack of acquired syphilis exhibits as its first symptom an initial sclerosis or chancre; and every chancre is followed by generalized syphilis. This lesion, which may assume many forms, occurs, in the major number of instances in this country, in the genital region. In a smaller proportion (5 to 10 per cent. in the United States),² it is found on the fingers, the female breasts, the lips, tongue, tonsils, eyelids, and in a lesser proportion on other parts of the face, body, arms, legs, and about the anal region. The lesion may originate in a scratch or other superficial excoriation, erosion, fissure, or herpetic lesion; and may assume the form of a moist papule, a scaling patch, or a circumscribed ulcer, always with an indurated base, which is well defined. In a general way, all chancres tend to conform to the papular type, other manifestations resulting either from its development or degeneration. Occurring upon mucous or quasi-mucous surfaces, these lesions are influenced by heat, moisture, and friction. Here the superficial erosions are usually circular in outline, are very slightly depressed, and they rest upon delicate beds of sclerosed tissue, the so-called "parchment induration." The papule

¹ Hazen, *Jour. Cut. Dis.*, 1913, xxxi, pp. 618-739: The Leukocytes in Syphilis (bibliography).

² Montgomery, *Jour. Cut. Dis.*, 1905, xxiii, p. 342: The Location of Extra-genital Chancres (bibliography).

is often represented by a tolerably well-circumscribed macular discoloration of the membrane, where, without careful examination, its elevation would not be noted, accompanied, however, by the usual induration of its base. As the result of heat, moisture, and friction, the typical dry and scaling papule constituting the chancre of the integument is here rarely encountered. More often the lesion is a circumscribed ulcer with clean-cut walls, penetrating deeply into the corium, or even below, with a scanty secretion and a reddish floor, resting upon a split-pea-sized, moist, and sclerosed tissue. Other usual forms are superficial erosions, in themselves of insignificant aspect, seated upon nodular masses or linear ridges of deeply sclerosed

FIG. 190



Initial sclerosis of syphilis (extragenital chancre).

tissue, undergoing repair or degeneration according to the condition of the patient and the treatment to which he has been subjected. Occasionally, voluminous indurations are perforated by deep, conical or funnel-shaped ulcerations of formidable aspect, to which the name "Hunterian chancre" has been applied.

Syphilodermata (*Syphilides*).—The skin manifestations of syphilis are of common occurrence, numerous as to their forms, and of great importance from a diagnostic point of view. Lesions of the skin appear in syphilitic individuals of both sexes, at all periods of life, and in all stages of the disease. These symptoms are, however, much more frequent during the first two years after infection, subsequent to which period the manifestations of the disease are betrayed more commonly

PLATE XXIV



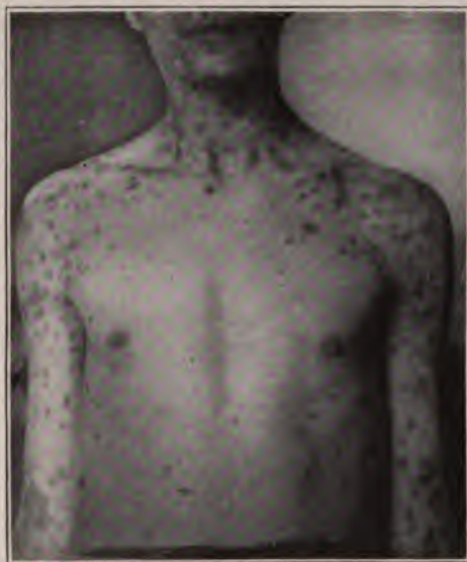
Lenticular Papular Syphiloderm.

in subcutaneous lesions, or lesions which affect the viscera and the osseous, nervous, muscular, and vascular systems.

General Characteristics of the Syphilodermata.—Syphilis may be benign or malignant. Ordinarily, it is only moderately severe. The cutaneous manifestations of the malady are protean in character. As early stated by Hutchinson, it is the great imitator of other diseases in its cutaneous manifestations.

Distribution.—The earlier lesions of syphilis are usually symmetrical, superficial, and more or less generalized. The late lesions are asymmetrical, deep seated, grouped, and more or less localized. In some cases there are exceptions of importance to the above rule. The

FIG. 191



Small, flat, papular syphiloderma.

eruptive phenomena of syphilis may be general or few, and either conspicuous and formidable, both as to their extent and persistence, or short lived and insignificant. It is said that as a rule the more general and profuse the earlier eruptions of syphilis, the more favorable the issue with respect to the prognosis.

Color.—The shades of color in syphilitic lesions are usually less brilliant than those seen in other skin diseases. Dull-red or an admixture of red, yellow and brown in varying proportions, frequently with a preponderance of the brown, is characteristic. The early macular eruption (roseola) is of a lighter hue. These color shades have been compared with that of raw ham and with copper hues; these, unfortunately, having been so associated with the syphilodermata that the non-recognition of such tints has led to error in diagnosis.

Configuration.—In the early lesions there is no characteristic arrangement except that assumed by annular papules and the deeper pustular syphiloderm. Relapsing early lesions may have a circinate arrangement. The late lesions are characterized in their arrangement by figures resembling a horse-shoe, the kidney, a half-moon, the letter S, and a dumb-bell, and it is of common occurrence to find outlines of patches, ulcers, and scars observing the curve of a segment of a circle, the coalescence of several such lesions tending to produce a serpiginous aspect.

Subjective Sensations.—The eruptions produced by syphilis are rarely attended by itching, burning, or painful sensations of any sort. This absence is often a positive aid in establishing the diagnosis, and as a rule is the more valuable the graver the lesion. Great difference, however, will be noted in this respect between different individuals. Occasionally, considerable itching will be induced by condylomata situated in the anal region, and syphilitic ulcers, especially of the leg, may be productive of more or less pain. As a rule, however, even with extensive destructive processes going on, practically no subjective sensations are present.

Career.—The early lesions of syphilis appear rather rapidly and usually attain their development in from one to two weeks, though new lesions continue to appear occasionally for some weeks, particularly the papular variety. After a few months the lesions gradually disappear, an occasional exception being those which occur on the palms and soles, which may be more or less persistent. Syphilis has been described as a chronic disease, and yet its lesions, compared with those of some other diseases, are of short duration. A characteristic feature of the late syphilodermata is their spontaneous involution with development in new areas. In this particular, syphilis is strikingly different from lupus and carcinoma, in which diseases lesions tend to persist in a single location for a long period of time.

Site.—No portion of the skin is free from the possibility of invasion by syphilis. The disease may involve at once almost the entire integument, or it may rapidly spread from point to point, having covered finally a large area; or it may appear conspicuously at distant and isolated points of limited extent; or, finally, it may be manifested in an insignificant lesion or group of lesions ephemeral in course and limited to one part of the body. Different lesions of the syphilodermata have sites of predilection, though lesions may be induced in any area by local irritation. The mouth and throat thus frequently show marked lesions as the result of local irritation from smoking. Predominant sites of syphilodermata are the hairy scalp, particularly at its borders, the vicinity of the mucous outlets, angles of the lips, the eyelids, the anal and genital regions, the palms and soles, the ala and the root of the nose, the forehead, the interdigital spaces of the feet, the umbilicus, the axillæ, and the groins. Special lesions occur only in certain areas, as, for example, the squamous syphiloderm of the palms and soles, the condylomata and mucous patches in moist

PLATE XXV



Lenticular Papular Syphiloderm.

regions, and the papules of the forehead (constituting the so-called *corona veneris*).

Polymorphism.—Often several varieties of lesions are present, especially during the early stages of the disease. Viewing the cutaneous and other symptoms of syphilis as a whole, this feature is significant, as it is possible to observe at one and the same time upon the body of a single affected individual symptoms indicative of pathological changes in the skin, mucous membranes, hair, nails, lymphatic glands, and periosteum. To a less marked degree this is true of the syphilodermata, several of which may coexist.

Concomitant Symptoms.—Along with the cutaneous manifestations of the early stages other symptoms may occur. The initial sclerosis may still be present or its scar be plainly visible. There may be adenop-

FIG. 192



Alopecia syphilitica (early form).

athy, usually general and characteristic; sore throat, mucous patches, alopecia syphilitica, iritis, and bone-pains. The skin is sallow and dingy, the hair lustreless and lifeless. Onychia and paronychia may occur. Alopecia occurs during the active stages and is exhibited as a general falling of the hair; or it occurs as ill-defined and incomplete patches. The coalescence of these patches gives the scalp a moth-eaten or mangy appearance. Alopecia also occurs in the scars following ulcerating lesions occurring in the scalp late in the disease. Onychia and paronychia usually occur during the early stages.¹ With the late manifestations concomitant symptoms are usually absent, but there may be bone-pains and cephalalgia.

¹ Cf. chapter on Diseases of the Nails Associated with Syphilis.

The cutaneous manifestations of acquired syphilis have recently been classified by George Henry Fox,¹ as follows:

FORMS.	VARIETIES.	DESCRIPTIVE ADJECTIVES.
		EARLY.
MACULAR.	Roseolar. Annular. Vitiligoid.	
MACULO-PAPULAR.		
PAPULAR.	Miliary . . . Lenticular . . . Discoid . . .	Disseminate, corymbose, annular. Disseminate, corymbose, hypertrophic, confluent, squamous. Moist, annular, confluent, squamous.
PAPULO-PUSTULAR.		
PUSTULAR.	Acuminate . . . Obtuse . . . Ecthymoid . . .	Crustaceous. Crustaceous. Crustaceous, rupial, ulcerative.
		LATE.
NODULAR.	Agminate . . . Circinate . . . Serpiginous . . .	Confluent, squamous, cicatricial. Squamous, crustaceous, ulcerative. Crustaceous, ulcerative, cicatricial.
SQUAMOUS.	Diffuse. Circinate.	
GUMMOUS.	Diffuse . . . Tuberous . . .	Verrucous, crustaceous, rupial, ulcerative. Ulcerative, cicatricial.

It is usual to classify the cutaneous symptoms of syphilis as early and late. The former are exhibited as macules, papules, and pustules; the latter as nodular, squamous (Fox), and gummatous.

Syphiloderma Maculosum (*Erythematous syphilide*, *Macular syphilide*, *Syphilitic roseola*).—This form of macular syphiloderm is the earliest expression of systemic cutaneous syphilis, and is more or less constant in occurrence, differing in this respect from several of the other syphilides. Often it is unnoticed by the patient, whose attention may first be called to it after its recognition by the skilled eye of another. It occurs in kidney-bean- to filbert-sized macules, roundish, oval, or of irregular contour, and varies in color from a light-rosy to a dull-mulberry hue. In some cases these markings of the skin-surface are very indistinct, requiring for their recognition close scrutiny in a clear light, and occasionally even then leaving uncertainty in the mind. With a lens tinted in cobalt-blue they may be recognized at an earlier date than if viewed with the unaided eye. At times they constitute an irregular "marbling" of the surface, of a kind which renders it difficult to define with the eye the individual lesions composing the eruption, while the general visual effect of the exanthem is distinct. The spots are not elevated above the general level of the integument, but may change in type, a papular lesion developing later in the same site.

¹ Jour. Cut. Dis., 1913, xxxi, p. 224. (This classification was adopted by the American Dermatological Association at its Thirty-eighth Annual Meeting, held in May, 1914.)

The eruption usually appears between the sixth and eighth week after the appearance of the initial sclerosis, and when untreated develops for about one week more. It may be gradual or sudden in evolution and persist for a variable period of time, depending upon the severity of the constitutional disorder and the treatment to which the patient is subjected. During the early part of its career, the hue of the lesion is lighter and may be made to disappear under diascopic pressure. Later the lesions become more deeply stained, exudation having occurred, and the color does not disappear under pressure. When involution is in progress, there is a slow disappearance of the eruption, which gradually fades and disappears in the course of from one to three months.

The eruption may be limited to the skin of the abdomen; it may extend sparsely over the chest, the loins, the ano-genital region, and the thighs; or it may develop over the palms, soles, forearms, and legs; and, in exceptional cases, may profusely cover the entire surface of the body. Local irritation, such as that induced by the cuff about the wrist, or pressure of the belt, may increase the number of the lesions in certain situations; and they may be made temporarily more conspicuous by exertion, stimulants, and hot baths, or other causes of cutaneous hyperemia. They disappear leaving either no trace of their former existence, or slight pigmentation, or they may develop into papules. Papules and pustules may be coincident. The lesions may recur at any time up to the end of the first year, and if so they are more localized, the individual macules larger, and they frequently assume an annular configuration.

Fournier,¹ Nielsen,² Crocker,³ and others have described erythematous lesions occurring in circinate arrangement several years after infection. The titles *neuro-syphilide* (*Unna*), *circinate syphilitic erythema*, and *tertiary circinate erythema* have been used to designate this condition, which consists of erythematous lesions occurring as circular patches or narrow rings, with normal or pigmented centres, and segments of circles, which by coalescence form gyrate figures. Their color is reddish or reddish-yellow. They remain of the size of their original development, and present no infiltration, but at times exhibit moderate scaling. The lesions are usually few in number and are situated chiefly on the forearms, the thighs, the nates, and the sacrum. They are resistant to treatment, have a tendency to recur, and, as a rule, are unaccompanied by other symptoms of the disease, though in some cases syphilis of the central nervous system has been concurrent.

Diagnosis.—The recognition of the macular syphiloderm is readily established when concomitant symptoms, such as the primary lesion or its relics, mucous patches, or alopecia are present. From scarlatina, measles, and r  theln it differs in the indolence of the rash; the

¹ *Annales*, 1896, vii, p. 1141.

² *Monatshefte*, 1896, Bd. xxii, No. 10, p. 500, and No. 11, p. 555.

³ Page 848.

absence, in most cases, of decided elevation of body-temperature; and the order of its appearance in different portions of the body, as it rarely occurs first upon the face. Urticaria and the rashes induced by the ingestion of copaiba and other medicaments are distinguished by the marked itching of the affected surface and by their very general diffusion over the entire body, a condition less often observed in the syphiloderm. Tinea versicolor, usually limited to the anterior surface of the trunk, is characterized by a fawn-colored to a chocolate-colored tint; by the furfuraceous desquamation, which the patient usually describes as most noticeable after a hot bath; and by the demonstration of the vegetable parasite (*Microsporon furfur*) among the scales scraped from the affected surface. Tinea versicolor is, moreover, of much longer duration than a syphiloderm, and almost never extends to the exposed parts of the body—the face and the hands. Ringworm of the skin of the body is not symmetrical, and is a parasitic disease. Pityriasis rosea occurs in well-defined, saffron-tinted, small-egg-sized scaling patches, usually on the trunk only, the long axis of the patch at right angles to the vertical axis of the body. The disease is never accompanied by adenopathy.

Pigmentary Syphiloderm (*Vitiligoid* (Fox, G. H.); *Leukoderma syphiliticum*, *Vitiligo acquisita syphilitica*).—This is a rare form of syphilis, usually occurring on the sides of the neck in women, and first described by Hardy,¹ in 1853. Subsequent descriptions have been made by Fournier,² G. H. Fox,³ Atkinson,⁴ Taylor,⁵ Maireau,⁶ and others. Much difference of opinion has existed concerning the disorder, some viewing it as a hyperpigmentation and others as a depigmentation of the cutaneous surface. According to the observation of different observers, both forms exist.

The disorder occurs most commonly from the sixth to the twelfth month after infection, but its occurrence may be of later date. It may be the only manifestation of the disorder, or it may occur in connection with other cutaneous symptoms. It appears usually under the age of thirty-five, and generally in women.⁷ The lesions are rounded, slightly oval, or irregularly shaped, split-pea- to dime-sized or larger, discrete or confluent macules, either well defined or having irregular margins, and of a *café-au-lait* color, which does not disappear on pressure. They may be conspicuous or faint, in the latter case being difficult of detection, appearing like patches of dirty skin. The intervening skin seems whiter than normal. The patches may coalesce, forming a delicate network. In another type the discoloration is more or less uniform, and in it there later appear white spots, which

¹ *Maladies de la Peau*, Paris, 1853, p. 154.

² *Leçons sur la Syphilis*, Paris, 1873, p. 422.

³ *Amer. Jour. Med. Sci.*, April, 1878.

⁴ *Chicago Med. Jour. and Exam.*, October, 1878.

⁵ *Jour. Cut. Dis.*, 1885, iii, p. 97.

⁶ *Thèse de Paris*, 1884; abstr. *Jour. Cut. Dis.*, 1885, iii, p. 218.

⁷ Little, *Brit. Jour. Derm.*, 1911, xxiii, p. 184: *Leukoderma Syphiliticum* (case demonstration, male patient).

gradually increase in size, and which after a time have oval, rounded, or irregular lines of pigmentation between the whitish areas. At this time vitiligo is strongly simulated, the surface of the lesions being smooth and non-elevated, and the condition being unaccompanied by subjective symptoms. The evolution of the lesions is slow, and they may last for a few months to two or three years, being resistant to the usual treatment for syphilis. In a study of the lesions in a patient, Taylor watched the development of a single pigmented spot and concluded that there is a pigmentary lesion *sui generis*. He further stated that in certain cases syphilis causes an abnormal distribution of pigment (Neisser's *leukoderma syphiliticum*), and his conclusions were, first, that syphilis produces pigmented macules without change in the intervening skin; second, that it causes hyperpigmentation, with coexisting vitiligo; and, third, that it also causes an abnormal destruc-

FIG. 193



Pigmentary (vitiligoid) syphiloderm.

tion of the amount of pigment normally present in a given portion of the skin in which there is a preponderance of the vitiliginous appearance coincident with the pigment spots. German authors (quoted by Crocker) regard the disorder as a simple leukoderma of syphilitic origin on the site of a previous roseola. Fox regards it as of syphilitic origin, but not as a direct manifestation of syphilis. Duhring¹ states that in nature it is a simple pigmentary formation, probably differing in no way from chloasma. The lesions are found chiefly on the neck, particularly at the sides, but are also occasionally found on the face (chiefly on the forehead), the chest, flanks, and rarely on the limbs.

The disorder is to be distinguished from vitiligo, which is asymmetrical, selects as its site the face and the dorsum of the hands and forearm, and the patches of which are of larger size; from chloasma,

¹ Diseases of the Skin, 2d ed., 1876, p. 485.

which occurs in large patches, usually on the forehead and sides of the face, with possibly associated systemic conditions; and from tinea versicolor by the presence in the latter of scaling, the occurrence of the lesions chiefly over the chest and back, and by the microscopic demonstration of the *Microsporon furfur*.

Hyperemic patches differing from the macular lesions above described were first recorded by Ehrmann.¹ These lesions occur in association with other manifestations of the disease and on various parts of the body. The patches are slightly elevated, of livid-red color, and present a tree-like form, consisting of bands joining a common trunk, or a peculiar network arrangement. In sections there were noted new vessel-formation and an obliterating endarteritis, and the *Spirocheta pallida* was found in the vessel-walls.

Syphiloderma Papulosum.—The type of all cutaneous lesions produced by syphilis is to be recognized in the papule. Papules occurring in syphilis may appear as the first cutaneous evidence of the infection, or they may be developed from earlier macules. They may be small or large, acuminate or flat, disseminated or in groups. They commonly occur during the first six months after infection, but relapsing forms may develop some time later. While frequently generalized, they have sites of predilection, such as the face, neck, flexor surfaces, and ano-genital region.

Small Acuminate Miliary Papular Syphiloderm (*Syphilitic lichen. Follicular syphiloderm*).—In this eruption the lesions are millet-seed- to hemp-seed-sized, circumscribed, globular, acuminate, reddish or salmon-reddish, firm elevations of the surface, or minute nodules upon the skin, generally symmetrically developed, often over the entire body, closely set and occasionally grouped in crescentic figures. When viewed with care, a minute vesicle, pustule, or scale may often be detected on the conical apex of each papule; the vesicular or pustular lesions rarely developing, however, to such an extent as to become a characteristic feature of the eruption. The color is at first, especially in blond skins, a mixture of salmon and red; later the darker and browner shades appear. When generalized, the eruption is well developed, especially over the posterior surface of the body, the occipito-cervical and scapular regions, the buttocks, and the calves of the legs, though it is often distinct about the anus and genitalia. Like several other of the syphilodermata, its earlier manifestations are more symmetrical than its later, whether these be tardy or relapsing or both. Involution occurs by resorption of the plastic exudate, minute and usually scanty, dirty-whitish scales encircling the base of each lesion. The eruption occurs during the first six months after infection, and its evolution is complete within two weeks. Where the lesions last for a considerable time, they leave pigmentation and permanent pitting. The eruption as a whole is indolent in undergoing involution, at times persisting for several weeks or months, and though

¹ Trans. VI. Internat. Derm. Cong., 1907, ii, p. 763.

it is quite amenable to vigorous treatment it responds more slowly than several other forms of cutaneous syphilodermata.

Diagnosis.—The eruption is to be distinguished from *keratosis pilaris*, the lesions of the latter being less distinctly papular, less vividly colored, and occurring more extensively on the extremities. From *psoriasis* it is distinguished by the distribution of the lesions, which in the latter disorder occur particularly about the extensor surfaces of the joints and in the scalp, while the *miliary papular syphiloderm* occurs quite commonly on the face, neck, and parts

FIG. 194



Corymbose papular syphiloderm.

of the trunk not particularly selected by *psoriasis*. The individual brownish, acuminate, follicular papule of the syphiloderm, often grouped, with moderate scaling, is, in most cases, distinctly different from a patch of *psoriasis*. Squamous *eczema* is distinguished by the presence of itching, more marked scaling, less infiltration, a lighter tint of redness, and poorer definition of the patch. From *pityriasis rubra pilaris* it is distinguished by the absence in the latter of any tendency to vesiculation or pustulation in connection with the individual papules; by more profuse scaling when patches are formed by coalescence of the lesions; and by the

frequent association of a palmar hyperkeratosis, a facial seborrhoeic dermatitis, and a pityriasis of the scalp. Finally, the dark, hyperkeratotic, follicular papules occurring on the dorsum of the fingers are characteristic of pityriasis rubra pilaris. Lichen planus is distinguished by its flat papules, having an irregular or angular base, by their linear or stellate arrangement, by the peculiar violaceous color, and by the constant associated itching sensations. The concomitant symptoms of the disease, if present, are valuable aids in the differentiation of all the above-mentioned disorders.

FIG. 195



Lenticular papular syphiloderm.

The Lenticular Papular Syphiloderm. — This often follows the macular form, the lesions being flattened or hemispherical, firm, pea- to finger-nail-sized, circular or oval, and they may be found on all parts of the body. They are seen most commonly on the forehead, face, neck, trunk (chiefly over the back), the flexor surfaces of the limbs, and about the ano-genital regions. They may be smooth and glossy, or scale covered, and are often surrounded at their base by a fringe of epidermis. Their color varies from a light-red early to a yellowish- or brownish-red later. Below the knees they may be purplish. On the face they select the hair-line on the forehead. On

it is quite amenable to vigorous treatment it responds more slowly than several other forms of cutaneous syphilodermata.

Diagnosis.—The eruption is to be distinguished from *keratosis pilaris*, the lesions of the latter being less distinctly papular, less vividly colored, and occurring more extensively on the extremities. From *psoriasis* it is distinguished by the distribution of the lesions, which in the latter disorder occur particularly about the extensor surfaces of the joints and in the scalp, while the *miliary papular syphiloderm* occurs quite commonly on the face, neck, and parts

FIG. 194



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at times, especially in moist situations, the top of each plaque is a smooth, flat plane. They present the usual variations in color, and may scale at the edge or over the top. They seldom have a generalized distribution, but are limited to special regions. On the face they may form rings by involution of their centres. On the trunk or other parts of the cutaneous surface they may form patches by coalescence of different lesions. The patches when scale covered resemble psoriasis (*papulo-squamous syphiloderm*). They may occur along with lenticular

FIG. 197



Annular papular syphiloderm. (Fordyce.)

papules or independently, usually, however, following the latter, and not infrequently as a relapsing eruption. The *annular papular syphiloderm*, which occurs most frequently in the colored race, and especially on the face, presents a well-defined, raised margin, which may be smooth or be made up of individual smaller papules, and may be formed either by the clearing centre of a discoid patch or independently. In rare instances concentric rings occur, and by coalescence of several of these a gyrate configuration is produced.

PLATE XXVI



Annular Papular Syphiloderm.

In a study of annular lesions of syphilis occurring in the negro, Hazen¹ noted their development from both large and small flat papules, including the scaling (papulo-squamous) variety; from follicular papules, from papulo-pustules, and from maculo-papules; also in two cases of hereditary syphilis. Their evolution occurred both by peripheral extension, with clearing of the centre, and by the coalescence of individual lesions in a ring formation.²

The *papulo-squamous syphiloderm* bears, in many instances, a close resemblance to psoriasis, but it may usually be readily distinguished from the latter by a consideration of the following points: The syphilide, as a rule, is not generally distributed, though such a distribution occasionally occurs, and the lesions are apt to be less symmetrically disposed than the patches of psoriasis. The individual papules present greater infiltration; are dark-red or brownish-red in color; and are covered with more or less adherent, grayish or darker colored scales. Frequently, the papule is surrounded by a collarette of scales, while the scales of psoriasis spread in an imbricated manner, covering the entire lesion and extending beyond the border. Interspersed among the scaling patches of the syphiloderm may be found individual brownish-red papules characteristic of syphilis, and possibly other lesions presenting a multiform eruption. The lesions are more apt to be found on the flexor surfaces, about the face, and in other situations not commonly selected by psoriasis. In the latter disease the color of the papules is reddish; the scales are white, shining, imbricated, abundant, loosely attached, and cover the entire lesion, as above stated. They elect the extensor surfaces and are found abundantly in the scalp, and uncommonly on the face and palms, areas frequently attacked by the syphilide. Subjective symptoms are absent in the latter disease but may be present in the former. In the presence of the concomitant symptoms of syphilis, exhibited as mucous patches and moist lesions about the ano-genital region, with some constitutional disturbance, the diagnosis is made without difficulty.

Moist Papules (*Mucous patches, Condylomata*. Fr., *Plaques muqueuses*; Ger., *Schleimhautpapeln, Feigwarze*).—Moist papules occur on portions of the body where two surfaces come in apposition, and present characteristics differing from those in other situations, due to heat, moisture, and friction. Their common sites are the genital region, about the anus, vulva, scrotum, and thighs; beneath the mammary glands in women; in the axilla and naso-labial folds; at the angles of the mouth; and between the fingers and toes. They may be well defined or have an indefinite contour; may be soft, spongy, or firm; and present a grayish or brownish, secreting surface. Beginning as flat papules, they may by maceration become more flattened and indefinite in outline, being covered with a thick mucoid secretion; or,

¹ Jour. Cut. Dis., 1913, xxxi, p. 148.

² Cf. Atkinson, Jour. Cut. Dis., 1883, i, p. 15; Fox, H., *ibid.*, 1908, xxvi, pp. 67-109; *ibem*, Archiv, 1912, cxiii, p. 315; Gilchrist, Maryland Med. Jour., 1900, xliii, p. 200.

hibit a loosened and partially detached film of membrane covering the tissue, beneath which a reddish, raw-looking surface appears. One or several may be present, and they occur most commonly during the active period of the disease. They are most often seen inside of the lips, near the angles of the mouth; also on the buccal mucous membrane, the fauces, the tonsils, and on the tongue. On the dorsum of the latter, reddish, smooth areas may be noted; while on its under surface lesions simulating condylomata may occur, presenting warty and vegetating growths. At the angles of the mouth some thickening, with consequent fissuring, not infrequently occurs. Erosions may be present, making the ingestion of hot liquids and acids difficult and painful. Superficial ulcers, covered with grayish-white exudation and surrounded by a red areola, occur; while deeply situated and destructive ulceration may attack the tonsils.

Opaline plaques occur as flattish, smooth, bluish-white or lead-white, firm, slightly indurated, and roundish or highly irregular areas. They are relatively painless when not the seat of ulceration. They are visible on the dorsum of the tongue, on the mucous lining of the cheeks, and at the angles of the mouth, in which latter site they are situated often in part on the mucous surface and in part on the skin of the lip. The thickened epidermis is at times covered with adherent, not readily removed scales, between which fissures form; and the patch, at first almost insensitive, becomes exceedingly tender and painful.

These patches are for the most part leukoplasic, due chiefly to irritation of the mucous surfaces by tobacco smoke, yet recurring in syphilitic subjects; and they are preceded often by typical mucous patches. They are almost exclusively seen in men.

In addition to the above described conditions, the mucous membranes are affected, both early and late in the disease, with lesions resembling those occurring in the skin, the differences between the two types being those induced by heat and moisture. Usually at the moment of the outbreak of general syphilis or soon after, a pharyngeal or pharyngo-nasal blush may be seen extending irregularly or symmetrically over the parts, accompanied often by engorgement of the tonsils. There are then associated pain and swelling, and complications may arise producing laryngeal hoarseness, cough, dyspnea, aphonia, and nasal discharges, with a moderate amount of obstruction of the nares. In the later stages gummatous infiltrations of the mucous membranes occur in both circumscribed and diffuse forms, superficial and deep. In the diffuse superficial forms, both the mucous and the subcutaneous tissues are involved in a firm thickening, best studied on the surface of the tongue, which then appears polished and smooth, at times as if covered with a thin, transparent varnish. Patients exhibiting this condition will often describe a subjective sensation of "slipperiness." These thickenings may involve the deeper structures by every gradation, producing eventually lobulated masses with intervening fissures, tender, raw, and excoriated. The surface of the tongue is then, as a rule, covered with a foul, dirty-grayish coat, and it

as is often the case, especially in the genital region, become hypertrophied, distinctly elevated, well outlined, and present the characteristics described as condylomatous. When the secretion is removed, the surface of the lesion is seen to be pinkish or light- or dark-red in color. About the vulva, over the perineum, and about the anus large plaques may form by coalescence of individual lesions, which may become warty, papillomatous, or vegetating. The mucoid or mucopurulent secretion, which may be abundant in these regions, is characterized by an intensely offensive odor.

The secretion from all these lesions is highly infectious, and while, by autoinoculation, lesions of a similar type are induced, in new soil they produce the usual initial lesion of syphilis and are responsible for the major portion of new infections.

FIG. 198



Vegetating condylomata of the vulva and anus.

Mucous patches are merely syphilitic papules occurring in moist situations, flattened by reason of the apposition of affected surfaces and by contacts necessitated by the functions of the parts involved. They form upon all mucous surfaces, but especially in the mouth, where they are the most annoying and the most persistent symptoms of syphilis, complicating both the early and the later stages of the disease.

The patches are roundish or oval, tumid, flattened or very slightly depressed, pale-rosy or whitish spots, moistened with mucus, and either developing as such or resulting from hyperemic plaques, or dispersed among or upon the latter. They often resemble the patches produced on the mucous membrane by penciling the latter with a crayon of silver nitrate. When carefully inspected, many of them

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FIG. 199



Squamous syphiloderm, late eruption.

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late outline. The eruption is frequently both the palms and soles, but is rarely hands and feet, and then never developed from the palmar or plantar regions. surfaces of the hands, feet, fingers, and toes, scales. Occasionally, the entire surface of with papulo-squamous lesions, which by these involvement, being, however, well the normal integument. The exanthem,

is occasionally notched at the edge with deep ulcers. At times the tongue is mottled, with patches of redness alternating with the yellowish-white of the deposit on the surface of the membrane, and more rarely the tip is covered with florid, verrucous, filiform growths.

The deeper gummata involve the body of the tongue, and they are felt as submucous, diffuse or circumscribed, dense thickenings (usually tolerably well defined), which soften, ulcerate, and leave exposed to view extensive losses of substance. The floors of these excoriations are deep ulcers, indurated, sloughing, and with membranous shreds over the surface. The fissures of the sides of the tongue described above may here also produce deeply ulcerated notches in the substance of this organ. Deformities of this class are relieved markedly after cicatrization, even when considerable loss of tissue has resulted.

Diagnosis.—Mucous lesions are to be distinguished with care from simple aphthous patches in the mouth the result of indigestion or local disturbances; also from smokers' patches (*leukoplakia buccalis*, *psoriasis linguæ*, *leukoplakie*), and from lichen planus of the mouth. In external features these patches may resemble one another, but in only one affection (syphilis) are there other signs of infectious disease. The chief points of difference are: singleness, for the most part, of aphthous sores, and often exquisite tenderness; multiplicity, as a rule, of mucous patches, and much less soreness, though when ulcerated the soreness may be a conspicuous feature. Linear streaks and bands (often quite insensitive) of leukoplasic patches are found, especially along the gums, on the lines of the inner cheek (representing contact with the approximated upper and lower teeth), and in the pocket posterior to the wisdom tooth. The flattened and often isolated patches of lichen planus of the tongue have an almost characteristic lead-white color.

Condylomata are to be differentiated from *verruca acuminata*. In the absence of the concomitant symptoms of syphilis, some difficulty may arise. The narrow base and pointed top of *verruca acuminata*, even when the lesions are abundantly developed and massed together, immediately distinguish it from the condyloma, whose base is broad and infiltrated, and surface flat, verrucous, or papillomatous.

Palmar and Plantar Syphiloderm (*Squamous syphiloderm*).—In consequence of the thickness of the epidermis of the palms and soles, the papular or papulo-squamous syphiloderm of these regions is presented under somewhat atypical forms. The eruption in these situations may occur in symmetrical distribution, early in the disease, as a part of a generalized efflorescence; or somewhat later as a relapsing manifestation, in which case the lesions are apt to be more localized, asymmetrical, and persistent; and finally, many years after infection, as a late manifestation, when it is exhibited in typical development. Here, as in the relapsing eruptions, the lesions may be asymmetrical and more or less localized, though the entire palm or sole may be involved, and even in symmetrical arrangement.

Papules and nodules which occur on other portions of the skin are prevented from forming on the palms and soles owing to the peculiar anatomical structure found here. The pathological manifestations are consequently displayed rather as thickenings, separations, frayings, and stainings of the epidermis. Here, therefore, are seen dull-red macules, covered throughout or merely at the edges by scales or epidermal shreds; and minute, firm, corneous thickenings, few or many, often without color in consequence of the depth of the blood-vessels beneath the opaque, horny layer. Occasionally, with a pointed instrument, pinhead-sized and larger deposits resembling chalk may be pried from circular beds in the palms and soles where the lesions first develop (*syphilide cornée* of the French). These and similar spots frequently are covered with dirty-whitish, often tenacious, half-loosened epidermic flakes, which are characteristic. In other cases, usually in consequence of the motion of the hand or foot or of the exigencies of toil, irregular, angular losses of epidermis occur resembling the fracture of a pane of glass. The attached portions of the epidermis project at the edges only over deep fissures, broad exulcerations, or a dull-red, tender, and newly-formed epidermic layer. At times, distinctly elevated and circumscribed papules or nodules of the usual livid-red color, varying in size up to that of a coffee-bean or slightly larger, are seen, which may be aggregated in patches having

a tendency to assume a circinate outline. The eruption is frequently symmetrical in the centre of both the palms and soles, but is rarely found upon the dorsum of the hands and feet, and then never developed typically, but always by extension from the palmar or plantar regions. It may extend to the lateral surfaces of the hands, feet, fingers, and toes, as well as over the wrists and ankles. Occasionally, the entire surface of one palm may be covered with papulo-squamous lesions, which by coalescence have produced diffuse involvement, being, however, well defined at the margins from the normal integument. The exanthem,

FIG. 199



Squamous syphiloderm, late eruption.

except in the earlier cases, as above described, is usually persistent and rebellious to treatment.

Diagnosis.—The eruption in these situations is to be distinguished chiefly from psoriasis and eczema. The former disease, with rare exceptions, is not limited to this region, and only occurs here coincidentally with lesions distributed in other situations. When occurring here, the scaling in psoriasis is more profuse and the scales are more readily exfoliated, leaving a reddened, tender epidermis beneath. Eczema involving the palms and soles usually invades also the dorsal surfaces of the hands and feet. On the palms a more uniform involvement is apt to occur, or the lesions will be distributed about the margins, not selecting particularly the centre of the palm. Extension to the fingers, also, is more frequent, and the edematous infiltration of the tissue produces characteristics differing from the cellular induration occurring in the syphilid. In eczema the lesions are apt to be disposed in par-

FIG. 200



Squamous syphiloderma, late eruption. (Foerster.)

ticular areas irritated by articles used in the occupation, the latter being operative to a less extent than in the case of the syphilid. In either case, associated lesions, or a history of their having been present, are important aids in diagnosis. In all cases confirmatory evidence may be obtained with the Wassermann reaction.

Syphiloderma Vesiculosum (*Varicelliform syphilid*). — Vesicular syphiloderma are rare cutaneous symptoms of syphilis, if they do actually occur. Pinhead- to pea-sized, conical, globoid or umbilicated, isolated or grouped, crusting elevations of the epidermis, with lucid or cloudy contents, have been observed upon the face, the trunk, and the genitalia of syphilitic subjects. The eruption is described as an early syphiloderma, often exhibiting a halo of characteristic tint, the resulting crusts being granular and somewhat lighter in color than those commonly seen in the disease. Both small and large vesicles have thus been assigned to the disease, and these, according to their

resemblance to non-specific exanthemata, have been described as varicelloid and herpetic. It is thought that the larger number of these lesions are either immature pustules, exanthematous lesions in syphilitic subjects, or pure accidents of the syphilitic process. With regard to the first theory, it may be said that the pustular syphiloderm not rarely begins as a vesicular lesion; with regard to the second that coincidence of so common a disease as syphilis with other cutaneous disorders is a matter of frequent observation; and with regard to the third, bearing in mind the large quantities of potassium iodid taken for the relief of the disease and its capability of exciting a vesicular eruption, it can reasonably be concluded that some at least of the cases of so-called vesicular syphilis have been imperfectly studied. That a true syphilitic lesion represented by vesicles does occur, there is no doubt, but it is unusually rare.

Syphiloderma Pustulosum.—These lesions occur usually in the cachectic and the illy nourished. They vary in size from that of a pin's-head to a finger-nail or larger; may be acuminate, flat, or hemispherical in shape; few or many in number; grouped or disseminated; and they may develop from papules or begin as vesico-pustules. They may be surrounded by inflammatory areolas, may spring from an unaltered integument, or be subepidermic in situation and scarcely project beyond the surface. They are usually covered with reddish-brown to greenish-black crusts, which develop in strata or laminæ by accretions from below, and even when superimposed upon a moist and secreting ulcer they are adherent at the edges. Seated upon superficial or deep, sharply defined, secretory ulcers, they may occur early or late in the disease, and at either epoch may constitute trifling or grave cutaneous lesions. They have a marked predisposition for involvement of the sebaceous and pilary follicles, and they are frequently disposed about the mucous outlets of the body.

Small Acuminate Pustular Syphiloderm (*Miliary pustular syphilid*).—This exanthem usually occurs in the early months after infection, but may appear later. The eruption is usually diffuse, and the acuminate pustules are located about the hair-follicles. The condition is rare in patients of the better class, and may represent, as Jullien has suggested, a transformation from papular lesions due to pus-infections of skins that are usually unclean, irritated, or the seat of diminished vitality. The pustules are acuminate, and each contains but a droplet of cloudy serum or pus, the desiccation of which furnishes a thin, yellowish, or reddish-brown crust. The fall of the latter exposes the grayish epidermal fringe of the base occasionally seen in papules of similar size. The lesions occasion little or no subjective sensation. They may be discrete, confluent, disseminated, or in groups affecting the curve of a circle. The extremities and the trunk are chiefly involved, though the disease may be well-nigh universal in distribution. Upon involution of the lesions, minute punctiform and pigmented, cicatricial, atrophic depressions occur, which later disappear. Relapses occur when treatment has been irregularly pursued. Miliary papules are often inter-

spersed among the pustules. The eruption, aside from uncleanly conditions, is seen chiefly in the so-called "ignored" cases.

Large Acuminate Pustular Syphiloderm (*Acneiform, Varioliform, Obtuse syphiloderm*).—This exanthem of syphilis, sometimes generalized, occurs within the first eight months after infection, and is usually the result of a cachectic condition of the patient or unhygienic care of the skin. The eruption consists of small- or large-pea-sized, grouped or disseminated, acuminate or well-rounded, fairly well distended pustules, which may be seated at the orifices of the pilo-sebaceous ducts. The lesions may begin as reddish macules, pustules, or papulopustules, and may have a tinted border of a coppery hue. They

FIG. 201



Large, flat, pustular syphiloderm.

have a thin roof-wall, and while usually acuminate they may flatten, after full evolution, in consequence of partial collapse. The fact that the lesions sometimes suggest umbilication has led writers to use the term "varioliform" in their description, an unfortunate term, which tends to introduce confusion in the description of strictly syphilitic lesions. The eruption may be scanty or profuse; be rapid or slow in evolution; may develop in crops; and may be coincident with the so-called syphilitic fever. When desiccating, the pustules furnish a dirty-brownish, occasionally blackish, crust, covering ulcers of varying depths. The scars left may be persistent, but usually lose many of their distinctive features in the lapse of time.

The eruption, aside from the covered skins of the uncleanly, is seen also on the face, about the alæ of the nose, and about the mouth in subjects of the disease who are anemic, cachectic, or who have been long given to dissipation.

Diagnosis.—The diagnosis between this eruption and variola is established readily, in view of the rapid changes occurring in the last-named disease, the febrile phenomena, the order of appearance of the variolous exanthem, and the evidence furnished by other non-cutaneous symptoms of syphilis which are usually present. The drug exanthemata usually are characterized by more pronounced subjective sensations; the several forms of impetigo are seen very rarely elsewhere

FIG. 202



Large, flat, pustular syphiloderm.

than on the face and hands; and acne, limited chiefly to the face and shoulders, never furnishes a distinct ulcer beneath its crusts, and is accompanied over the scalp and elsewhere by characteristic comedones and other stigmata of a sebaceous-gland disorder.

Flat Pustular Syphiloderm (*Impetigoform and ecthymaform syphiloderm*).—This is a relatively frequent manifestation of the syphilis occurring upon the face, the scalp, the trunk, the flexor surfaces of the extremities, and in the genital region, usually within the first year after infection. The exanthem exhibits a decided tendency to characteristic and circular grouping about the mucous outlets of the body.

Such groups are composed of small or large, flat, discrete pustules, pinhead- to pea-sized or larger, originating as reddish macular lesions, which tend to dry into flattish, irregular, dirty-yellowish or brownish, adherent crusts. These crusts either exceed the limits of the diseased surface beneath, or are conspicuous upon a dull brownish-red area of inflamed, eroded, and at times even ulcerated aspect. Often the pustules are so closely set as to become confluent, in which case a

FIG. 203



Large pustulo-crustaceous syphiloderm of the scalp and body.

single convex crust like a carapace will completely cover the involved area. The eruption is of pustulo-crustaceous type, and is usually amenable to judicious treatment.

The larger lesions of this type represent simply the same features to an exaggerated extent. In these there occur superficial ulcerations covered with flattish crusts, which are blood-mixed, and reddish- and greenish-brown in color. The superficial variety of this syphiloderm

is distinguished from the deep chiefly by the extent of its ulcer, the size of its superimposed crust, and the lighter, dull-red areola which encircles it.

Pustulo-ulcerative Syphiloderm.—The deep variety, like the superficial, may be limited to the scalp, face, neck, and flexor aspects of the extremities, or it may be diffused much more widely. The entire surface of the body may be covered with discrete lesions of this type in cases of unusual neglect or of profound cachexia. The eruption is usually of late occurrence, but in the so-called "galloping syphilis" of the French it may be precocious in development. The lesions are purulent and have a deep, infiltrated base, with a dark-brown halo. Incrustation follows, with the formation of a conical, roundish or oval, blackish-brown crust, beneath which lies a clean-cut ulcer, the sharp edges of which are usually exactly covered by the incrustation. The crust thickens by concretions from the ulcer beneath and spreads at the periphery while it thickens in the centre. In this way the appearance of the stratified crust resembles that of an oyster-shell, a condition described by some authors as *rupia*, a term once employed as the name of a disease. The ulcer exposed after removal of the crust is of characteristic syphilitic type in its deep base, foul floor, clean-cut edges, and purulent secretion commingled with blood. At times it attains a diameter of several inches and has a circular, contour. The degree of destruction it may produce is inversely proportioned to the constitutional vigor of the subject and the treatment pursued. It is usually a grave, and may be a malignant, exanthem, though under favorable circumstances it is amenable to judicious treatment. It may be an early, though often it is a late, symptom of the disease. The pigmented scars left are characteristic and indelible.

Diagnosis.—Impetigo is readily distinguished from the pustular syphilodermata by its more superficial character (the crusts presenting a "stuck on" appearance), the frequent presence of vesicles, and the absence of other signs of syphilis. Ecthyma at times presents some difficulty. Here the lesions are found largely below the knees, are irregularly placed, and while a certain degree of cachexia is usually present other signs of syphilis are absent. In doubtful cases a Wassermann test should be employed.

Syphiloderma Bullosum (*Pemphigus syphiliticus*). — Bullæ in acquired syphilis are late, relatively rare, lesions. They are rarely numerous, pea- to large-nut-sized elevations of the epidermis, filled at first with a cloudy serum, which soon is transformed into pus, often commingled with blood. They have usually a characteristic halo about the periphery, are roundish or oval in contour, are usually discrete, rarely disseminated, and after development they produce characteristic crusts with underlying ulcers, identical in feature with the rupioid sequels of large syphilitic pustules. The eruption is localized by preference upon the extremities, more particularly the lower extremities, and is indolent in its course. It is always significant

of the cachectic condition in the subject of the disease, and occurs often in the victims of chronic alcoholism who have been infected with syphilis. It is to be distinguished from pemphigus vulgaris by its characteristic crusts and ulcers, considered in connection with the history and associated symptoms of syphilis.

Nodular Syphiloderm.—In this eruption, which may develop within the first year after infection, but is usually deferred much longer, the lesions are multiple, flat, roundish, circumscribed, firm, light-red to dull crimson-red nodules, beginning commonly as macules of a lurid hue. They vary in size from that of a coffee-bean to that of a small nut, and involve the entire thickness of the skin, often also the subcutaneous tissue. Their surfaces are smooth, glazed, or desquamating; and in the variety under consideration their evolution

FIG. 204



Nodular syphiloderm. (Howard Morrow.)

is peculiar in that they rarely exhibit apical pustulation or ulcerative degeneration. The eruption is, with few exceptions, limited to one or more regions of the body, as the forehead, the chin, the nucha, the buttocks, and the outer surface of the thighs. It is less often disseminated than grouped. Occasionally, there may be but a single lesion, the recognition of its character usually demanding some skill on the part of the diagnostician. When occurring in groups, the typical circinate appearance of the syphilodermata in general may be wanting, the patches having an irregular boundary; but at times the circular, reniform, or horse-shoe-shaped outline is distinct, with an enclosed area of integument unaltered or the

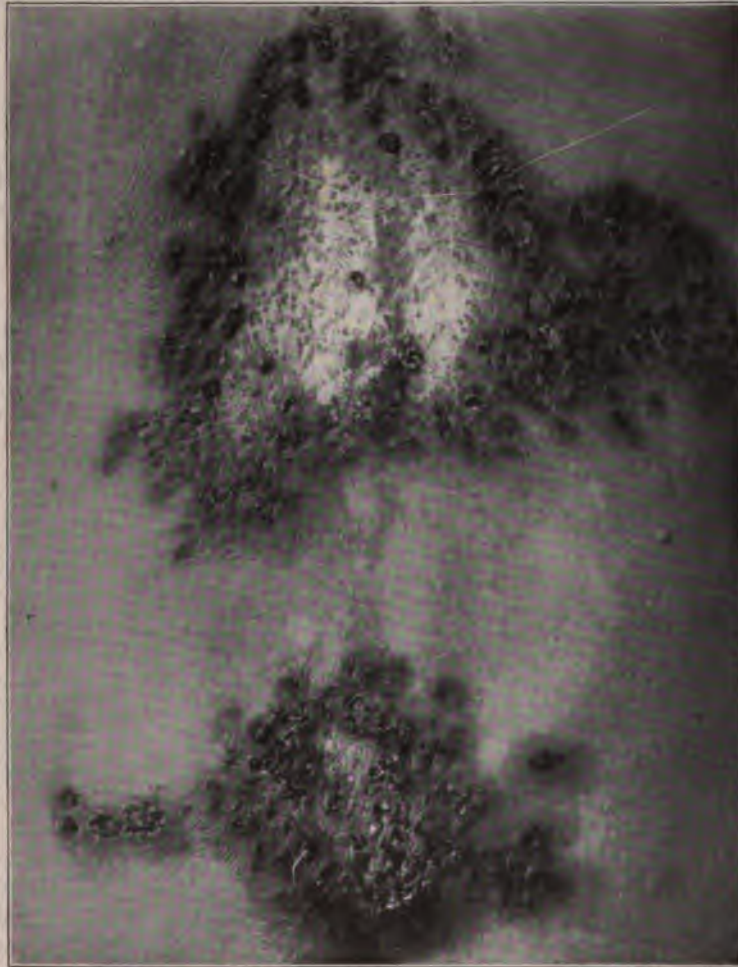
seat of atrophic changes. Whether resolving by absorption or degenerating by ulceration, they commonly leave the typical cicatrices of syphilis.

At times the lesions assume a *serpiginous* character and distribution, in which case secondary changes commonly occur. They may become covered on the surface with a thin, yellowish crust; may lose their firmness and become soft, and of a rather more lurid red in hue; from colloid or suppurative degeneration they may vegetate luxuriantly and become the seat (especially in the scalp) of warty growths, covered with a semipurulent secretion of disgusting odor (*syphilis papillomatosa*, *syphilodermia frambesioides*); or, finally, they may ulcerate, the superimposed crusts thickening in bulk, deepening into greenish or blackish shades, and covering typical syphilitic ulcerations,

with characteristic floor, edges, base, and secretion. The degeneration in the latter case may be rapid and the destruction extensive.

The course of the eruption is indolent, months usually elapsing before full evolution is accomplished. In untreated cases there may be produced a generalized and symmetrical syphiloderm. It is rare,

FIG. 205



Ulcerative nodular syphiloderm.

however, even in hospital and dispensary cases, to observe such development. The more superficial, generalized and symmetrical are the lesions, the briefer, as a rule, is the interval between such an eruption and the date of infection. The later the lesions, the more are they asymmetrical, localized, and profound in their involvement of the deeper tissues. This syphiloderm occurs more frequently in the

third and fourth year, less often in the second, and more rarely in the fifth, tenth or fifteenth year of the disease. Resolution occurs by resorption, leaving in the site of the nodules, according to their age, size, and contents, livid and pigmented maculations, or characteristic pigmented, atrophic, cicatriform areas. Scars following the ulcerative lesions are typical in color, shape, and career, the pigmentation of both cicatrix and areola blanching from centre to periphery and leaving a delicate, dull-whitish, glazed, or slightly desquamating surface. Ancient relics of this process resemble thin, small-coin- and larger-sized, circular sheets of mica.

FIG. 206



Facial cicatrices of nodular syphiloderma
after twenty-five years of infection

Various combinations of the nodules of syphilis with other lesions may occur, which has given rise to a number of different terms expressive of these associations. The rarer generalized forms are commonly of multiple type. The circumscribed groups, whether serpiginous or limited to a single region, frequently present variations which may cause confusion. For example, the affected patch may cover the surface of an entire limb or buttock, or merely involve the nose and upper lip; or possibly in irregular extension only the face. Whether of the resolute or ulcerative class, the circumscribed patches commonly are sluggish in development and career, often sprinkled with superficially ulcerated points set in areas of atrophic or scar-formed tissue; or, again, they may furnish a ring of ulceration,

deep or superficial, about a healing centre; or a group of well-defined ulcers may be beset with nodules of different types. The strictly serpiginous patch extends, whether over an ulcerated or partly healed centre, by advancing a ridge of closely agglomerated or fused nodular lesions, crusted, ulcerated, or merely resolving by degeneration when treatment has been pursued. Even in exaggerated types of the serpiginous patches, the process in untreated cases is one of advance, repair, ulceration, and scarring in different grades at different points in the same area. The rupioid features seen in the larger pustular lesions are displayed here more rarely and less classically. It is of interest in the study of these cases to note that in almost every instance the

disease either has been unrecognized, and therefore untreated, or is one occurring in the subjects of cachexia, debauchery, or extreme poverty.

Diagnosis.—The diagnosis is between lupus vulgaris, lepra, epithelioma, acne rosacea, and psoriasis. In lupus, the age of the subject,

FIG. 207



Nodular syphiloderm, resolute and serpiginous.

the character of any scars left upon the body-surface, the chronicity of the disease, and the absence of a history of polymorphism, will point usually to the nature of the disease. A close resemblance between lupus and late syphilis about the nose is occasionally noted. The rapidity of the ulcerative process and bone-involvement likely to occur

in syphilis are important points of distinction. The nodules of lepra are very much more indolent than those of syphilis, and have a characteristic oiled or varnished look, never the livid or dull-crimson color of syphilitic lesions. Set upon the forehead, the nodules of syphilis, near the line of the hairs, never give the leonine aspect of those at the lower border of the forehead and over the eyebrows of the leper. In epithelioma the age of the subject and the history of the disease are always significant. In the early stage of epithelioma characteristic "pearls" often may be recognized. While the patient suffering from epithelioma may enjoy excellent general health, the imprint of cachexia is often distinct in nodular syphilis of the skin. In the later stages of epithelioma, the ulcer with everted edges and

FIG. 208



Nodular syphiloderm.

eroded, hemorrhagic floor, "varnished" with a translucent secretion, is totally different from the "punched-out" syphilitic ulcer, with its puriform secretion and discolored crusts. The deep infiltration of even the desquamating nodular syphiloderm distinguishes it from the circular patches of psoriasis. In acne rosacea the telangiectases, characteristic redness, and frequent pustular lesions are suggestive, when considered in connection with the absence of ulceration. But in both sexes, subjects of syphilis in the middle periods of life, with nodules limited to the nose and head, often present themselves with marked rosacea from spirit-drinking, when the most careful examination is needed to detect the coincidence of the two disorders.

Gummatous Syphiloderm.—Gummatous lesions, as a rule, are late manifestations of the disease. In rare instances, in cases which might be classed as malignant or precocious, they may form a part of the early manifestations, in which case they are apt to be more generalized and symmetrically placed. Commonly they develop as one or relatively few subcutaneous, strictly circumscribed, firm, well-defined, painless, and indolent nodules or tumors, which when first observed are scarcely larger than a pea. They are then covered with an unaltered integument and are movable. Very slowly they increase in size until they attain the dimensions of a marble, an egg, or even of bodies of a larger size. Sooner or later they become attached to the overlying skin, which assumes a livid reddish or purplish hue, surrounded by a hyper-

emic areola. Finally, at one or at several points, the skin becomes thinned and is incapable of further resistance, the gumma bursts, and the thick, sanious secretion, the gummy character of which has given the lesion its name, escapes. When the inflammation has been active, the secretion may be wholly or partially purulent, and in this case is furnished either by the contents of the tumor or by the peripheral tissue, which participates in the process. Ulcers result, which occasionally are fistulous in type, roundish or oval in contour, with clean-cut edges and purulent floor, often extending to the subcutaneous tissue, tendons, aponeuroses, cartilage, or bone. Thin and yellowish bands or bridges of undermined skin often extend between several such lesions and usually melt down in the destructive process. When repair is progressing, which is the rule as regards the ultimate result, granulation springs from the floor of the ulcer, the edges contract, and the gummatous lesion eventually exhibits the appearance of a simple ulcer, save in the thin, purplish, pigmented appearance of the outlying integument. The scars are typical, pigmented at first, and bleaching from the centre, and they may in rare instances be attached to the periosteum of the bone. Considering the depth of the process, the gumma of the skin is, as a rule, succeeded by less evidence of destruction than is threatened at the height of the process. About the neck cicatrices may be roundish in shape and slightly puckered; upon the extremities and the trunk they are usually circular or oval.

But one gumma may appear upon the person of a single individual, and when this is the case it will usually be found upon the leg. After this region, the forehead is most often attacked. Half a dozen or more may at times coexist; in rare cases hundreds form. Gummata may develop upon any part of the body, more particularly over the head (face, nose, lips), scalp, thighs, legs and arms, buttocks, and genitalia. When situated over the trunk on a nerve, they may become the seat of severe neuralgic pain. They are amenable to skillful treatment, and they may undergo resorption, leaving little trace of their former existence.

Diffuse Gummatous Infiltrations of the Skin and Hypoderm are either distinctly outlined, which is the rule, or occasionally ill defined at the border, varying in extent from a coin-sized patch to an irregularly outlined infiltration covering the integument of an entire limb. The

FIG. 209



Gummatous and ulcerating syphiloderm. (Howard Morrow.)

central portion and borders of such an area may be constituted of partly fused, originally discrete lesions, as in the instance of the nodular lesions above described; or they may be made up of a thin plate of infiltration, breaking down at various points and showing actively ulcerating areas. In extreme cases loss of tissue may be great, furnishing the picture of a group of typical syphilitic ulcers having a sloughing floor and a precipitous edge. The patch or patches often form curiously outlined parts of circles in the classical figures of the letter S, the horse-shoe shape or the kidney, these composite groups including equal-sized circlelets of infiltration, with border ulcers; or

FIG. 210



Gummatous syphiloderm.

a larger central patch with gummatous infiltration is surrounded by smaller patches set in a circle about the former, as in the arrangement of pearls in a brooch. In less classical features there is presented the rare picture of a swollen, engorged, almost elephantiasic organ (leg, vulva, nose), crusted, corded, ridged, knobbed, and seamed with larger or smaller ulcers or scars.

Diagnosis.—Gummata are to be distinguished from fibrous, carcinomatous, and lipomatous tumors, as also from indurated and enlarged lymphatic ganglia. As gummata of the skin occur in preponderance below the level of the knees, and are for the most part single or

relatively few in such situation, by their position alone they frequently may be differentiated from each of the new-growths mentioned, no one of which occurs by preference upon the lower extremities. As they are, moreover, relatively late lesions of syphilis, a history of preëxisting symptoms of that disease usually can be obtained.

The element of time is of chief importance in the diagnosis, as the evolution of gummatous syphilis is more rapid than that of most tumor-formation affections. The characteristic "pearls" of epithelioma, and its situation chiefly on the face, will serve to suggest the diagnosis when the gummatous lesions are on the extremities. Lupus of the extremities is rare. Gummata of the face are confused most often with the two disorders last named. Invariably, in all doubtful cases in the male sex, the testicle should be examined, as frequently

a tell-tale gummatous infiltration of the epididymis or testicle proper, unrecognized by the subject of the disease, clears up the doubt.

Syphiloderma Hereditarium.¹—Hereditary syphilis, which may be displayed first in infancy or in early adult years, is always strictly transmitted by inheritance from one or both parents. Recent investigation appears to prove that the major portion of infections are of maternal origin. The consideration of the disease in these pages being limited to its cutaneous manifestations, it is first to be noted that the infected fetus may be prematurely expelled dead-born, with

FIG. 211



Syphiloma of the vulva, with gummatous changes in labia and clitoris, and languettes of anus accompanying stricture of the rectum.

cutaneous symptoms displayed upon its body-surface. According to Kassowitz,² abortion or premature delivery occurs in 40 per cent. of syphilitic conceptions.

This condition generally argues in favor either of intense syphilis in one or both progenitors, or, more commonly, of relatively recent infection of both. Under these circumstances, there are usually evidences of the death of the fetus at some date prior to its expulsion,

¹ Boardman, *Jour. Cut. Dis.*, 1914, xxxii, p. 545: Syphilitic Heredity and Congenital Syphilis (An excellent review of the subject of recent literature, references and findings). Hyde, *Med. News.*, December 4, 1897: What Conditions Influence the Course of Infantile Syphilis?

² Kassowitz, cited by Osler and Churchman: *Osler's Modern Medicine*, iii, p. 480.

the skin being macerated and the epidermis raised from the corium in few or many bullous lesions, beneath which the derma exhibits a livid, reddish or purplish hue.

Infection may take place at any period after conception and the disease develop either before or after birth. As a rule, manifestations are exhibited within the first four weeks after birth, and practically always within three months. It is rare for it to develop subsequent to this date.

Congenital syphilis differs from the acquired form by the absence of a primary lesion; moderate or no glandular involvement;¹ greater severity of symptoms; and a marked intermingling of cutaneous lesions, with little or no chronological order in their development. Cutaneous symptoms may be present at birth, in which case the disease is usually severe and the prognosis grave; or the child may be born with a clean skin, be plump and well nourished, and the cutaneous manifestations occur at a later date. The earlier the date of the appearance of lesions, the more intense, as a rule, is the disorder. The first symptoms displayed are significant of visceral involvement, and are, in brief, those of marasmus. Emaciation progresses rapidly; the skin seems stretched unnaturally over the facial bones; the expression is that of physical distress; the cry becomes a fretful moan; the integument loses the rosy hue of the healthy infant, and acquires instead a sallow or muddy tint. The resemblance of the facies of these emaciated infants to those of the aged is striking.

Coryza is an early symptom, due to the specific involvement of the Schneiderian membrane. The discharge from the nares (at first serous, later purulent) desiccates sufficiently to obstruct the nasal passages, or, in consequence of the tumid condition of the membrane lining the passages, is prevented from escaping. At times, crusts accumulate externally about the nasal orifices, and they are seen to be similar to those which are prone to form also at the angles of the mouth. In this way, the characteristic "snuffles" of the syphilitic infant are induced, in consequence of which it is obliged, when nursing, to release the nipple from the mouth in order to respire, an act often accompanied by a hoarse cry. The breathing of a syphilitic infant, even when asleep, or awake and undisturbed, is often sufficient to arouse a suspicion as to the nature of the disease from which it is suffering. The mouth, the larynx, the vulva, and the anus are often the seat of similar lesions, the development of which into an obstructive tumefaction, secreting more or less profusely, or into condylomata, will largely depend upon the seat and surroundings of the lesion.

Bullæ in hereditary syphilis may be early or late manifestations of the disease, and they may be represented by a single lesion on the palms or soles (the site of their predilection), the fingers, toes, or extremities; or they may constitute a symmetrical, generalized

¹ Boardman (loc. cit.) states that adenopathy frequently occurs, and quotes McCarthy (Practitioner, London, 1913, xc, p. 624), as finding enlarged epitrochlear glands of diagnostic importance.

efflorescence. They are not infrequently the first manifestation of the disorder. Bullæ should be regarded as evidence of a grave form of the disease, being often the precursor of a fatal issue, and indicating a feeble resistance on the part of the epidermis to the fluid exudate furnished from the corium beneath. In severe cases, the bullæ are ill developed, and the integument will be seen to be marked here and there by small-coin-sized and larger disks or plaques of macerated epidermis, separated from the corium by a thin film of serous, sanious, or purulent fluid, in quantity insufficient to raise the roof above the general level of the integument. When fully developed, they may be conical, rounded, flat, or flaccid, and be surrounded by an infiltrated border of dark-reddish or violaceous hue. Their color varies with the color of their contents. In extreme cases they may be distended with blood only. Their subsequent career is concluded by shallow or by deep ulceration, the floor of each bulla secreting a sanious discharge. Crusts may form if the patient survives. A fatal termination is usually announced by flattening or collapse of the blebs. The eruption may be uniform, due to the fact that bullæ represent the site of feeblest resistance in the epidermis, the fluid exudate, of exceedingly low grade, mechanically separating the rete from the tissues beneath. The lesions may be limited to the palms and soles, which is the more common occurrence; or they may be generally diffused over the cutaneous surface; and, finally, they may be commingled with pustules, maculo-pustules, condylomata, and mucous patches of the anus, the mouth, and the nares.

Macules, in hereditary syphilis, appear early, and may be discrete, irregular as to shape and size, and of a pinkish or dark-red color. They occur first over the region of the buttocks and extend from there over the limbs, involving also the face and neck. By coalescence, a more or less diffuse, coppery-red or violaceous, glazed, or moist and secreting surface is formed, affecting an entire region, such as the genitalia, the trunk, the thighs, the neck, the palms, and the soles. Desquamation frequently follows, which is in sharp contrast to the course of the macules occurring in acquired syphilis. Infiltration of the erythematous areas occurs, the skin becomes thickened, and not infrequently in the extensive patches deep excoriations and fissures occur. From the fluid exudate irregular crusts are formed, producing a general aspect somewhat similar to that seen in eczema, yet differing markedly in color from the latter disease. In rare instances, a diffuse, reddened, scaling condition develops, which resembles to a marked degree the general exfoliative dermatitis described by Ritter. In moist regions the epidermis covering the erythematous areas frequently becomes removed, leaving a raw, exuding surface.

The *papules* of hereditary syphilis resemble in many respects those of the acquired form, and vary similarly as to size, shape, evolution, and involution. They may be acuminate, convex, flat, large or small, smooth or scale covered; may spring from preceding macules, or develop independently; and may terminate in pustules, bullæ, or

condylomata. Small papular forms may be of extensive or limited distribution, and occur chiefly on the limbs. They may be diffuse or grouped, scale covered or capped with a pustule. More commonly, dull-red or violaceous papules of lenticular size occur, either in symmetrical or asymmetrical arrangement, being discrete or agglomerated in patches of infiltration. About the buttocks and other regions they may scale at the apex, while over the palms and soles they may constitute by fusion a thickened, desquamating epidermal patch; or, commonly about the ano-genital region, the interdigital spaces, the axillæ, and the face, they may become moist and secrete a puriform mucus. By vegetation or by hypertrophy, they develop into flat or fissured condylomata, covered with an offensive yellow or yellowish-white discharge, and varying in size from that of a small coin to a lesion a centimeter or more in diameter, with corresponding variation in the degree of their elevation from the affected surface. These condylomata may be few or numerous; at times a large portion of the cutaneous surface is covered with large, moist, secreting papules. Occasionally, they may become ulcerated and encrusted. Rhagades frequently occur about the angles of the mouth, upon the site of an infiltrating erythematous lesion or papule, occurring as the result of movement of the affected parts. The linear scars resulting from these are characteristic of the disease. At the height of their development, opening and closing of the mouth is both difficult and painful.

Vesicles in hereditary syphilis are rare. They are described as having a conical apex and serous contents; as being closely set together about the lips; and as springing from a violaceous, infiltrated patch. Crocker¹ describes vesicles of millet-seed size appearing singly or in groups, and with little or no redness at their base, which subsequently developed into pea- to hazel-nut-sized bullæ. Grindon² described two instances of true vesicle-formation occurring in hereditary syphilis, in both of which the vesicles were rather extensively distributed.

Pustules in hereditary syphilis may be discrete or confluent, localized, or, very rarely, generalized. As above described, they not infrequently occur consecutively to papular lesions, and are an evidence of a cachectic condition. They are prone to occur in groups about the mucous outlets and in association with other lesions of the disorder. They may ulcerate and become covered with bulky, dark-colored crusts. Pustules may be seen in typical development by the side of the nail, occasionally involving the matrix, and producing in this situation considerable swelling of the digit, with an ulcerative sequel, which commonly results in distortion or an ultimate loss of nail-substance.

Small abscesses resembling furuncles may occur, which may be few or numerous, and are characterized chiefly by their indolence.

Nodules and *subcutaneous gummata* may develop in hereditary syphilis, but only as late manifestations of the disease, one or more years elapsing before their appearance. Their behavior is like that

¹ Page 883.

² Jour. Cut. Dis., 1910, xxviii, p. 24.

observed in the acquired form of syphilis, although the destruction wrought by their degeneration in very late manifestations may be of the most intractable type. The subsequent ulceration and destruction of tissue may be marked in these cases, particularly about the anus and mouth. Usually, there is a history of preceding parental disease, and coincident symptoms or sequels of such disease in altered teeth (as described by Hutchinson), an ancient keratitis, and bone deformities.

Mucous patches are constant symptoms of the disease, and they represent papules of the mucous membranes that differ from those in the skin only because they are moistened, macerated, and flattened by juxtaposition of neighboring tissues. They are surrounded usually by a lurid halo, and they may have the pearly whiteness always seen when the epidermis of mucous membranes is wholly or partially detached from the corium; or they may lose this protecting covering in shreds or patches, leaving a denuded or ulcerating surface. They may be isolated or broadly confluent, and be oval, circular, or decidedly linear in shape, the last-named appearance being characteristic of patches existing at the angles of the mouth.

Diagnosis.—The diagnosis of hereditary syphilis usually presents little difficulty. A combination of lesions, such as condylomata about the ano-genital region, erythematous and papular lesions about the mouth, associated with rhagades; the characteristic rhinitis, possibly also laryngitis, with associated cachexia, leave little doubt as to the nature of the malady. Pemphigus and bullous impetigo are not limited to the palms and soles and are unaccompanied by the associated conditions above described. Eczema and intertrigo of the genital region are differentiated by the lighter color of the lesions and the absence of infiltration, itching, and constitutional impairment.

Prognosis.—The future of the infant affected with hereditary syphilis is not always as dark as might be gathered from what has preceded. In this, as in the acquired form of the disease, benignancy may be in rare cases a conspicuous feature of the entire process. The evolution of the disease may be tardy; its symptoms be few and unimportant; its amenability to judicious treatment be speedily demonstrated. Still, the fact remains that the disease when inherited is far graver than when acquired, the victim of inheritance entering the world with its viscera and bones subject to profound pathologic alterations. Attention has been directed to the important fact of the frequency with which the syphilitic product of conception perishes.

Etiology.—Syphilis, in the course of which appear the syphodermata, is produced by infection, either accidental, intentional, or *in utero*. The causative organism reaches the blood through the medium of the lymphatics, and is subsequently distributed throughout the body. The physiological secretions of the infected, uncontaminated with pathological products, are believed to be incapable of acting as virus-carriers; but, especially in the recently infected,

such contamination is of frequent occurrence, and is effective in the transmission of the malady.

The methods of transmission may be immediate, as in sexual congress, in kissing,¹ in medical examinations, and in nursing at the nipple, by which act the child may infect the nurse with the secretion of the mucous patches in its mouth; or the infant may, instead, receive the disease from excoriations on the breast of the nurse. The author has seen many examples of infection on the fingers of physicians acquired in medical examinations; also several on the eyelids, and several on other parts of the face and neck, including recently two just within the nose. The latter appear to have been due to picking or rubbing the parts with the fingers contaminated with the infective material from syphilitic patients. The disorder may also result through the medium of utensils charged with an infectious secretion, such as drinking-cups, the needles of the tattooer wet with saliva commingled with diseased mucus, or the lancet of the vaccinator covered with infected blood. Generally it may be said that all the discharging and moist syphilodermata are sources of danger to a sound individual, both in the acquired and the inherited forms of the disease. By these and other similar methods persons of both sexes and all ages may become infected.

The lesions may be accentuated by external irritations, such as a hot bath, friction, uncleanness, especially in infants by means of the soiled napkin; while late lesions may be determined to certain situations by injury.

Of the vast number of microorganisms alleged to be etiological in syphilis, only three need be mentioned. The first of these, the bacillus of Lustgarten,² discovered in 1885, is largely important on account of the great interest its discovery excited and the controversy which followed as to its rôle. The second is the *Cytorrhycles luis*, isolated by Siegel,³ which is important only from the fact that it led to the discovery of the third and most important of these microorganisms, the *Spirocheta pallida*. Siegel's cytorrhycles was considered of sufficient importance to be investigated by the German Academy of Sciences, which appointed Schaudinn and Hoffmann to undertake its study. During this investigation Schaudinn⁴ discovered a motile spirillum now universally accepted as the cause of syphilis.⁵ The *Spirocheta pallida* has been demonstrated in practically every lesion of syphilitic origin. All the organs of the new-born child affected with syphilis have been shown to contain the spirochetes in large

¹ Schamberg, Jour. Amer. Med. Assoc., September 2, 1911, p. 783: An Epidemic of Chancre of the Lip from Kissing.

² Wien. Med. Jahrbuch, 1885, p. 517.

³ Abhandlungen d. K. preuss. Akad. d. Wissenschaften, 1905, Abt. iii, s. i-xv; and Münch. med. Wochenschr., 1906, i, p. 63 (quoted by Metchnikoff: "A System of Syphilis" Power and Murphy, London, 1908, i, p. 49).

⁴ Arbeiten aus der k. Gesundheitsamte, 1905, xxii, p. 527.

⁵ For a review of early work concerning the *Spirocheta pallida*, see Levy-Bing, Paris Octave Doin, 1907; and Hoffmann, Verhandlung. der Deutsch. derm. Gesellschaft, 1907, p. 193 (750 articles).

numbers. They have also been isolated from tissues and organs in experimental syphilis.¹

The spirochetes first penetrate into the interstices of the tissues, and after that reach the blood- and lymph-vessels. In the tunica intima of the lymphatic vessels, spirochetes which have come from these sources cause changes in the connective tissue.

The *Spirocheta pallida*² averages in length 6 to 15 microns, although in some instances it may measure 16 to 20 microns. Its transverse measurement varies from one so minute that it can hardly be seen up to three-fourths of a micron. Its spirals number from 6 to 14 or more; the length and depth of the spirals varying from one to one and one-half microns. It is cylindrical, thus differing from other spirochetes, which are flattened. Another peculiarity is its spiral shape, whether in motion or at rest. It is a very delicate microorganism, and is destroyed rapidly in the absence of moisture. It has been kept alive for several days,³ but as a rule it retains its pathogenic power outside of the body for only a few hours (Metchnikoff). For immediate examination, the dark-background illumination method is preferable (Landsteiner and Mucha). This procedure can be practised in the ordinary routine of office examination as follows: Having the necessary condensor and a light of sufficient intensity, and also the proper objective and ocular for the microscope, a smear which has recently been prepared is examined, when the motile organisms are plainly visible in the field, and with some experience are readily differentiated from other spiral organisms. The smear is best made by thoroughly cleansing the initial lesion, then producing irritation with a sharp instrument, which induces some serum to exude. A droplet of normal-salt solution is applied to this, then the material is drawn into capillary pipettes, from which it is placed on the slide. If examined within a short time after removal, little difficulty is experienced in finding the organisms. The chief staining methods that are employed are the Giemsa, as modified by Schaudinn and Hoffmann; Marino's method,⁴ and Levaditi's modification of Ramón y Cajal's silver stain (particularly valuable as a tissue stain). The quicker method is by the use of India ink, or by the use of the Goldhorn stain.⁵ The organism has been grown in pure culture by Noguchi,⁶ who isolated six strains from material obtained from orchitis in rabbits and seven strains from initial lesions, condylomata, and papules in the human subject.

Pathology.—The histological changes in syphilis have been studied recently by Unna,⁷ Fordyce,⁸ Crocker,⁹ and others.

¹ Centralb. f. Bacteriologie, etc., 1907, xliv, p. 223.

² Hartmann and Prowasck, Arbeiten aus der k. Gesundheitsamte, 1907, xxvi, p. 14.

³ Centralb. f. Bacteriologie, 1906, xli, p. 741.

⁴ Annales de l'Institut Pasteur, 1904, p. 761.

⁵ Jour. Exper. Med., 1906, viii, p. 451.

⁶ Jour. Amer. Med. Assoc., 1912, lviii, p. 1163.

⁷ Histopathology.

⁸ Jour. Amer. Med. Assoc., 1907, xlix, p. 462: The Vessel Changes and Other Pathological Features of Cutaneous Syphilis (with 12 microphotographs).

⁹ Dis. of the Skin, 3d ed., p. 845.

The histological findings vary according to the lesion examined. In all forms except the macular syphiloderm, the changes are similar, varying chiefly in the degree of involvement of the blood-vessels and the amount of cellular infiltration. The vascular changes in all forms are characteristic, being most marked in late lesions. A cellular infiltration, composed of lymphocytes, plasma-cells, and occasionally multinuclear and giant-cells, is characteristic of the disorder. In the primary lesion there are found an increase in the blood-vessels and changes in their walls; a perivascular and more profuse cellular infiltration; changes of a greater or less degree in the collagen and elastin; and secondary changes in the epidermis. According to Hoffmann,¹ the spirochetes first enter the lymph-spaces of the rete, where they are protected against phagocytosis; or find their way into the lymph-vessels of the papillæ. After about three weeks a reaction occurs, due to multiplication of the organisms, indicated by an inflammation of the lining of the lymphatics and a perilymphangitis, followed by proliferation of the capillaries, cellular infiltration, and an increase in the connective tissue. According to Ehrmann, the spirochetes first penetrate into the interstices of the connective tissue, and after that find their way into the blood- and lymph-vessels. In a fully developed chancre, Fordyce found acanthosis, followed by new capillary formation and perivascular cellular infiltration, with invasion of the epidermis by leukocytes, diffuse cellular infiltration in the papillary and upper reticular layers of the corium, dilatation and increase in the blood- and lymph-capillaries, and some thrombosis. In the same area thickened and occluded vessels were noted; while in the adjoining tissue endo- and peri-arteritis occurred, with a perivascular infiltration composed largely of plasma-cells. Bands of hypertrophic connective tissue surrounded some of the vessels, a part of the active infiltration.

In the macular lesion the blood-vessels are dilated, and there is found a perivascular cellular infiltration, consisting of small round cells. The vessel-walls exhibit proliferative changes, due to the inflammatory reaction present. The normal wavy line between the corium and epidermis may be obliterated by the pressure from the products of the inflammatory reaction in the corium, or be normally present. In this lesion no changes occur in the appendages other than a moderate cellular infiltration.

In the large papule the chief changes are found in the corium, in which situation a marked cellular infiltration, composed of lymphocytes and plasma-cells, chiefly occurs, with vascular dilatation and thickening of the vessels by proliferation of the cells of their endothelial and fibrous coats. Plasma-cells multiply by mitosis, and by proliferation of connective-tissue nuclei spindle- and spider-cells are formed. According to MacLeod, the plasma-cells frequently occur in rows, due to infiltration between the collagenous bundles. In the epidermis,

¹ Die Etiologie der Syphilis. Monograph, 1906.

acanthosis, edema, and parakeratosis are found, with infiltration of polynuclear leukocytes.

In the small miliary papule Fordyce described an infiltrate surrounding the hair-follicle, composed of a reticular structure holding new-formed blood-vessels and round, plasma-, and connective-tissue cells in its meshes. The vessels in the centre were obliterated, while those at the periphery were dilated, thrombosis occurring in the superficial ones. At a distance the blood-vessel walls were thickened and surrounded by a mantle of round and plasma-cells. Fatty degeneration was noted in the coil-glands, which were surrounded by the cellular infiltrate above described.

In the nodular syphilid the vascular changes and cellular infiltration resemble to a marked degree those found in the papules above described. The blood-vessels are increased in number and show evidence of endarteritis. In the cellular infiltration numbers of polynuclear and giant-cells may be noted in addition to the plasma-cells, lymphocytes, and connective-tissue cells. In most cases a certain number of mast-cells and leukocytes also occur. According to Fordyce, the blood-vessels are increased in number, are the seat of an obliterating endarteritis, and are exhibited as solid cords of irregularly grouped cells, with pale-staining nuclei, accompanied by giant-cells with both peripheral and central nuclei. At the edge of the infiltration the blood-vessels show hyperplasia of all the coats and their lumen is narrowed. Thrombosis occurs in the lymph-spaces, and fatty degeneration and regressive changes are noted in the connective tissue. The evolution of giant-cells in the condition is believed by a number of observers to be from plasma-cells. According to Fordyce, they are produced in most instances by thrombosis of the vessels, with proliferation of the endothelium, and he explains the extension of the serpiginous forms by a progressive thrombosis of the vessels at the periphery of the lesion.

According to Neumann, gummata are recrudescences about the vessels, produced by a latent virus aroused to activity. Neisser¹ explains their development by the lighting into activity of spirochetes that have remained dormant. The minute structure of the gumma shows a dense infiltration of plasma-cells, lymphocytes, and fibroblasts, areas of caseation, and marked vascular involvement. The vessel-walls are thickened, their caliber reduced, and many are obliterated. By degeneration of the cellular deposits, a gummatous mass is produced, which breaks through the epidermis, producing the typical ulcer; or by their resorption an atrophic area replaces the normal structures. The overlying epidermis is thinned before rupture, and subsequently is destroyed by ulceration.

Diagnosis.—The differentiation of the various cutaneous manifestations of syphilis from disorders which they resemble has been

¹ Die experimentalle Syphilisforschung nach ihrem gegenwärtigen Stande. Monograph, 1906.

referred to under their individual descriptions. While in most cases the recognition of these lesions is a comparatively simple matter, in certain cases, owing to a close resemblance to other disorders, difficulty arises. It is therefore necessary in all cases to investigate in the fullest manner the history of the disease; of all prior skin lesions; of a possible primary sclerosis; of adenopathy; of all disorders affecting other organs of the body; and in women miscarriages and abortions. Often a single extra-cutaneous symptom is a valuable aid in establishing the diagnosis of syphilis. Not infrequently, the true nature of a peculiar eruption is decided by finding a characteristic patch on the tongue or the tonsil. It is therefore essential to examine the mucous membranes, the bones, and the viscera in doubtful cases, as they rarely fail to give evidence of systemic invasion when the disease is exhibited for any length of time.

Other cutaneous disorders occur during the course of syphilis, which are to be recognized and properly interpreted. The medicamentous eruptions, particularly those induced by the ingestion of potassium iodid, occur commonly and are at times confusing.

The diagnosis of syphilis has been largely perfected in all its stages by laboratory methods, consisting, early, in the microscopic demonstration of the *Spirocheta pallida*, later in the Wassermann reaction, and still later in the luetin test.

Microscopic examination of the primary lesion during the first few days after its appearance reveals the presence of the *Spirocheta pallida*, and thus renders an early positive diagnosis possible; whereas, in the past, much time was lost in waiting for the development of other symptoms. After two or three weeks, or in some cases a little longer period, the Wassermann reaction becomes positive, and this test then remains of the greatest value during the entire active stages of the disease, and of marked value, also, in the later stages. In the later and so-called latent periods of the disease, the luetin test becomes more useful.

The Wassermann reaction, while a most valuable addition, should be viewed as confirmatory of other findings, rather than as an absolute proof in itself.¹ Fildes² found in a review of the literature that the Wassermann reaction was reported as positive in 65 per cent. in primary, 90 per cent. in secondary, 83 per cent. in tertiary, and 44 per cent. in latent syphilis; and quotes Boas' figures as 73 per cent. in primary, 97 per cent. in secondary, 95 per cent. in tertiary, and 37 per cent. in latent syphilis. Certain other disorders, such as nodular leprosy, frambesia, sleeping sickness, and scarlet fever, not infrequently yield a positive Wassermann reaction. It is therefore evident, in view of the fact that it may occasionally be negative in positive cases and *vice versa*, that it must be considered only as a valuable aid in diagnosis. By many this reaction is looked upon as a symptom, which may be in abeyance from treatment or otherwise for varying periods of time,

¹ Ravaut, *Annales*, May, 1914, v, p. 285.

² *Brit. Jour. Derm.*, 1911, xxiii, p. 13.

and may then reappear. Again, there are certain cases, particularly in congenital syphilis, where the reaction apparently becomes permanent.

From the above, it becomes evident that, in the absence of a few disorders which rarely come into consideration, repeated negative Wassermann reactions over a considerable period of time (at least two years) usually, but not always, mean eradication of the disorder. A single test in doubtful cases should not be regarded as conclusive in either direction, and here repeated tests must be employed. A point of importance that every practitioner of medicine should recognize relative to these tests is the fact that a positive reaction does not necessarily mean that the cutaneous lesions under consideration are due to syphilis. A scar-leaving acne and other chronic dermatoses not infrequently are present in patients exhibiting no cutaneous evidences of syphilis. With the present refinement of technique, the element of error is reduced to a minimum and the employment of the Wassermann test is essential.

The value of the luetin test¹ is acknowledged.² In a way it is supplementary to the Wassermann reaction, in view of the fact that it reveals the presence of the disease in the late and latent stages, when other tests are unavailable. A positive luetin test is especially valuable, as it occurs in no other disorder, and is therefore specific.

Treatment.—Beginning with the successful transmission of syphilis to lower animals by Metchnikoff and Roux, in 1903, the discovery of the *Spirocheta pallida* by Schaudinn and Hoffmann in 1905, and the elaboration of the successful laboratory method of diagnosis, the complement-fixation test of Wassermann, the subject of syphilis has been entirely restudied, which has placed the methods of treatment formerly in vogue in a different light. Adding to the above the important study of Ehrlich in 1910, when he introduced salvarsan as a remedy, treatment has further been altered, and by a large proportion of the medical profession revolutionized.

The remedial agents now employed which may be said to be specific are mercury and arsenic, and others which contribute toward the relief of symptoms are the iodids and various tonics, which include iron, quinin and strychnia.

Although accepted by all observers as being the sheet-anchor in the treatment of syphilis, there has been the greatest difference of opinion as to the method of administration of mercury. Men of equal wisdom and experience have been decided in their opinion as to the value of certain methods and the inadequacy of others. It is safe to assume, therefore, that no method is perfect and applicable to every case, and that each method has its place. At the outset, the treatment

¹ Cf. chapter on General Diagnosis for technique and description of the reaction.

² Noguchi, Jour. Amer. Med. Assoc., 1912, lviii, p. 1163; Cohen, Archiv. Ophthal., 1912, xli, p. 8; Gradwohl, Med. Record, 1912, lxxxi, No. 21, p. 973; Robinson, D. O., Jour. Cut. Dis., 1912, xxx, p. 410; Fox, *ibid.*, 1912, xxx, p. 465; Foster, Amer. Jour. Med. Sci., 1913, cxlvi, p. 645 (some bibliography); Pusey and Stillians, Jour. Cut. Dis., 1914, xxxii, p. 560, and others.

of syphilis should consider the patient as well as the disease with which he is suffering, and a method that may be entirely successful with one may fail in another, on account of personal peculiarities.

The internal administration of mercury has been employed to a greater extent than any other method and has been described by the most eminent authorities in both the Old and the New Worlds. It is being used less and less, however, as other methods have become better understood. While certain recent observers believe that very few patients thus treated entirely recover from the disorder, yet the records of cases of men with large experience show comparatively satisfactory results. The method of inunction, so largely used in Germany and to a lesser extent in America, is a satisfactory method when properly carried out. The disadvantages are its uncleanness and possible lack of proper application. The method by injection, while strenuously objected to by numbers of authorities, is equally lauded by others. Opinion is still divided as to the choice of soluble or insoluble salts of mercury to be used by this method. The insoluble salts, while highly efficient, are not devoid of danger, and certain toxic effects are not infrequently noted; a number of fatal results have been recorded as following their use. They have the advantage of being comparatively painless, and as the injections with this form occur at infrequent intervals it is less difficult to obtain the patient's coöperation in the treatment. The soluble preparations cause more discomfort, but they are accompanied by less danger. As to their comparative efficiency, opinion, as above stated, is divided.

The method by fumigation, formerly employed a great deal in more or less malignant syphilis, is still used by some and is unquestionably of value.

Salvarsan and neosalvarsan have proven to be efficient additions in the treatment of the disease and form a part, of greater or less extent, of the treatment practised by a comparatively large proportion of the medical profession. On account of the dangers accompanying the use of these preparations, they have been vigorously attacked; and, in view of their acknowledged value, they have been equally lauded and recommended. While there are few who rely entirely on these drugs alone in the treatment of the disease, the number is not small that employ them in combination with mercury, with good results. Uniformity of opinion as to the size of the dosage, the length of the interval between its administration, and the number of doses to be given does not exist. Such questions would naturally be difficult to solve in a short time in a disease having such remarkable capabilities as those evidenced by syphilis.

As all of the above-mentioned methods are used by the best authorities, their individual description will follow.

The care of the general health of the patient, aside from the specific medication, is essential; and in view of the possibility of the spread of the disease through its contagious nature to innocent individuals, certain precautions are advisable, which should be explained at the

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outset to the patient. As a rule, assurance may be given that the course of the disorder is often benign, the disease productive of little discomfort, and in most cases curable, but it requires strict adherence on the part of the patient to the rules laid down for its management. The methods of possible transmission through the use in common of drinking-cups or drinking-glasses, or through physical contacts (by kissing or otherwise) should be definitely explained. The patients should be instructed as to the nutritious character of the diet they should select, and should be informed that increase in body-weight while undergoing treatment is favorable in the matter of prognosis; and that the starving and sweating processes, so commonly advised by institutions assuming to treat the disease, are both useless and harmful. In most cases, hot, Turkish, or Russian baths should be interdicted, inasmuch as they tend to produce cutaneous hyperemia and favor the occurrence of eruptions. Cool or tepid baths are to be employed sufficiently often to ensure cleanliness, and may be employed by means of the sponge or otherwise. The teeth, the mouth, and the gums require constant care. As a prophylactic measure, the use of the tooth-brush several times daily is a matter of importance, and in case any disease of the gums is present this should be treated. Equal parts of tincture of cinchona and tincture of myrrh rubbed over the gums twice daily, or a spirit-and-water lotion in the same manner, is of value when tenderness exists or other local changes in the gums occur. In case the teeth require attention from any cause, this should be given by a competent dentist.

Tobacco in every form is injurious and should be forbidden. Malt liquors, wines, and spirits should be employed only under the direction of the physician. They may be useful in the case of debilitated subjects of a certain class, and need not be prohibited *in toto* in those long accustomed to their use; at the same time, an improper use of stimulants is in the highest degree harmful.

A compliance with the laws of hygiene is even more requisite for the syphilitic than for the non-infected. Fresh air, social amusements, exercise, the regular routine of business life, and a proper amount of rest should all be urged. With this the patient should be encouraged to free his or her mind from needless anxiety, and avoid particularly the company and conversation of those similarly infected, whose opinions are based too often upon ignorance or upon knowledge of half-truths. The literature of syphilis, for a similar reason, is to be eschewed, as the mass of patients, too many of whom purchase treatises on the subject, are able only imperfectly to glean the meaning of the authors consulted.

It should be a rule to urge a married patient to inform the conjugal partner frankly of the fact of infection, for the sake of both. When this advice is followed, much future trouble is avoided, and one of the obstacles to a completely favorable issue is at once set aside. Recently infected young adults who have contracted a marriage engagement should invariably claim release from such a tie for the sake of all concerned.

Mercury.—*Ingestion.*—The treatment should be instituted as soon as the diagnosis is made. In the early stages the protiodid has been used most extensively in France and America. Of all classes of adult patients, including strong men and women, there are scarcely 2 per cent. who cannot take it if the dose be proportioned to individual susceptibility. It is usually administered in pill or in tablet form, in doses of $\frac{1}{8}$ (0.01), $\frac{1}{6}$ (0.013), $\frac{1}{4}$ (0.016), or $\frac{1}{3}$ (0.022) of a grain, three times daily, alone or combined with the extract of gentian. The dose may be increased gradually, according to the necessities of the case, from $\frac{1}{2}$ (0.033) to 3 (0.2), and even 4 (0.266) grains in twenty-four hours. Many of the gelatin-coated pellets found on the market contain accurately divided doses of the salt. Beginning with a minimum dose, this remedy is to be steadily administered, and the daily quantity used gradually increased until the degree of tolerance of which the patient is capable has been ascertained. Should the stools become frequent, pain be excited, or a slight effect be produced upon the mouth, as indicated by a metallic taste, moderate increase in the quantity of saliva, or any noticeable degree of tenderness of the gums, the dosage is to be gradually diminished until these symptoms disappear. Often the withdrawal of $\frac{1}{2}$ (0.033) or $\frac{1}{6}$ (0.013) of a grain daily will suffice to enable the patient to tolerate the quantity thus diminished. The medication is to be faithfully continued until the object in view is attained, viz., relief of all symptoms of the disease.

In the "tonic treatment of syphilis," the dosage is increased only on each third or fourth day, until irritative effects are produced, when, after an interval of two days, the quantity taken at the time of the production of such effects is reduced from one-half to one-third. This reduced quantity is termed the "tonic dose," and is thereafter continued throughout the treatment.¹ With relapses or recurrences the dosage is again to be increased until these are overcome.

Other preparations that may be used in the early stages are the mild chlorid, the tannate, blue mass, the bichlorid, the bicyanid, and hydrargyrum cum creta. The latter has been in the past a favored preparation with some English authorities. Morris² prefers the blue pill, given in dosage of 1 to 3 grains three times daily. The bichlorid and the biniodid are, as a rule, reserved for the later stages, when they are given in connection with potassium iodid, as they are soluble salts. With the above-mentioned preparations an impression is produced on the system that can readily be proportioned to the exigencies arising in the case, which can be sustained during the course of treatment, and which can be employed with little danger of immediate or remote deleterious consequences from the medicaments themselves.

In case it seems desirable, the mercuric iodid may be substituted for the mercurous iodid, beginning with a minimum dose of $\frac{1}{4}$

¹ Amer. Jour. Med. Sci., 1876, xcvii, p. 17; Philadelphia Med. Times, 1882, xii, p. 337.

² Dis. of the Skin, 5th ed., 1911, p. 504.

(0.001) and increasing this gradually to $\frac{1}{40}$ (0.0016), or rarely to $\frac{1}{20}$ (0.0033), either in pill or in solution. The average dose of $\frac{1}{40}$ (0.0016) of a grain in pill form, administered three times daily, soon after eating, is tolerated by the majority of all patients without deleterious effects.

Calomel may be administered in 1 or 2 grain doses (0.066–0.133) three times daily, in combination with an opiate to prevent its action on the bowels, or in $\frac{1}{10}$ grain (0.0066) dosage every hour during the day for two, three or four days. Gray powder in 1 grain (0.066) doses, or the tannate in $\frac{1}{2}$ to 1 grain (0.033–0.066), three times daily, may be employed. The bichlorid in doses of from $\frac{1}{20}$ to $\frac{1}{12}$ (0.0033–0.005) of a grain is administered in pill form or in solution, and has been extensively employed. It perhaps is better reserved for later periods, when it may be given in combination, as above stated. A rotation of the various preparations above mentioned has often been found of value, rather than the continuous employment of a single one.

With many physicians of experience it has been customary to employ opium, either alone or in connection with the mercurials, for the relief of ulcerative or other lesions of syphilis. Sometimes it is employed for the purpose of relieving pain; sometimes to prevent the cathartic action of mercury upon the bowels; and also for its supposed action in arresting the destructive processes of the disease. It should not, as a rule, be employed when by the reduction of the mercurial or by exchanging the latter for tonic treatment the same result may be reached. Temporary advantage is often gained by its employment, but this may be more than counteracted by its ultimate effect on the gastro-intestinal tract. Its value, however, is attested by sufficient authority to suggest its use where the effect of the mercury is marked, thus producing an exceeding looseness of the bowels.

The use of iron in connection with the internal administration of mercury is strongly urged. The *massa ferri carbonatis* in 5 grain (0.33) dosage, after meals; the ferric citrate with quinin, administered before meal hours; or other ferruginous preparations, should be employed. It has been customary to administer mercury energetically during the first year, intermittently during the second year, with a few courses during each of the third and fourth years.

Inunction.—Mercury may be introduced into the system satisfactorily by the method of inunction, and when thus employed is absorbed readily and its therapeutic value is great. Inunctions should be employed in every case which admits of it, since the gastro-intestinal tract is thus left undisturbed; and, further, the dose of any needed tonic preparation, or potassium iodid by the mouth, can be regulated without increasing or diminishing the quantity of mercury in daily use. Mercurial ointment combined with lanolin is best used for the purpose. Cleanly but less efficient substitutes for it are provided in the oleate of mercury, in the strength of 10, 15 or 20 per cent., but the blue ointment is the one most largely employed. From $\frac{1}{2}$ to

1 drachm (2.-4.) may be rubbed into the skin at night before retiring, and the part selected for inunction be cleansed by washing in the morning. Thorough cleansing of the area with soap and water, followed by sponging with an antiseptic solution before the application of the ointment, lessens the tendency to the development of a dermatitis. Continuous applications to a single portion of the skin are likely to induce such an inflammation, and it is therefore wise to select on successive evenings a fresh portion of the integument for the local application, preferably that where the epidermis is relatively thin, as, for example, the flexor aspects of the joints. The inner faces of the thighs, the sides of the chest, and the loins may be selected; but surfaces where there is a growth of hair should be avoided. The ointment in some cases may be well rubbed into the soles of the feet, which have previously been soaked in warm water, after which the stockings may be drawn over the feet for the night. When applied by an attendant, the back is the region usually selected. Welander¹ advises spreading the ointment on cotton, wool or linen and wearing it over a limb or over the surface of the chest. Should local irritative effects be produced, these subside readily, as a rule, after suspending the treatment and using a warm alkaline solution, followed by a bland dusting-powder. In the case of patients with unusually sensitive skins, the ointment may be diluted with lanolin, lard, or olive oil; and to make the inunction less disagreeable it may be scented with lavender, rosemary or bergamot. Inunctions may be repeated daily for thirty days or longer, after which a complete rest may be had for several weeks, when their employment for another similar period may be begun. In certain cases, after one period, they are applied at weekly intervals for some time, then a more energetic period is employed. At any time that a relapse or recurrence happens they are used more energetically. As the administration of mercury by inunction is, when well done, most efficient, it should be used in all practicable cases where this drug has been selected. Its quantity is to be carefully adjusted to fit the exigencies of the cases, and it may be practised nightly, weekly, or less frequently so long as there is a possibility of relapse. In this manner patients may be relieved of all symptoms of the disease who have not during their treatment swallowed a dose of mercury, and the permanency of whose relief has been shown during years of subsequent observation.

Fumigation.—One of the most effective methods of administering mercury is by fumigation in the vapor-bath. It is employed by many experts as the sole means of administering the mercurial selected for use, but it is, for the average patient, too inconvenient for continuous employment. It should regularly be ordered, first, in all cases in which the earliest syphilodermata are intense, generalized, and particularly conspicuous upon the face; second, in all obstinate cases in which the patients are not women nor cachectic subjects; third, at the outset

¹ Archiv, 1897, xl, p. 257.

of treatment of many "ignored" cases in which the syphilodermata, either more or less generalized, have proceeded to uninterrupted evolution; fourth, in the severe cases of patients coming from the country to the city, who are able to remain but a brief time within reach of advantages offered in metropolitan centres. From $\frac{1}{2}$ to 1 drachm (2.-4.) of calomel, metallic mercury, the bisulphid, the black oxid, or hydrargyrum cum creta may be employed for each bath. It is common to order 1 scruple to 1 drachm (1.33-4.) each of calomel and cinnabar. The patient is stripped of his clothing and seated in a chair, the patient and chair being completely enveloped in blankets, which are closely fastened at the neck of the bather. Beneath the chair is an alcohol lamp, surmounted by a metallic vessel containing water in ebullition, the hot vapor of which in a few moments induces copious perspiration. When this result is obtained the lamp is brought beneath a metal plate containing the substance to be volatilized. The patient remains exposed to the vapor about ten minutes after this process of sublimation is finished, and retires at once to bed without cleansing the skin, the fumigation preferably being conducted before the hours of sleep. In the morning a bath may be taken for the purpose of cleanliness. It is convenient in the generation of the vapor in this way to make use of the Schering or other fumigating lamp, but the materials requisite for the production of all desired effects, with the exception of the alcohol lamp and the drug, can be procured of any skillful tinsmith. In the city male patients are often sent to bathhouses, where the fumigation is conducted in the daytime; and, as a consequence, they rarely experience unpleasant effects, such as are popularly associated with "taking cold" after exposure to the action of the mercury. In most of these establishments provision is made that the head also can be exposed to the mercurial fumes, respiration being conducted through a tube in connection with pure air, a provision useful in certain cases of emergency; but only "emergency cases" should be required to resort to fumigation of the head.

Subcutaneous and Intramuscular Injection.—This method, which was first advocated by Scarenzio¹ in 1864, and popularized by Lewin,² has been extended largely since its acceptance as a scientific procedure. It is efficient and speedy, and is now the method of choice of an increasing number of authorities. In common with some of the other methods employed, injection provides for the exclusion of the medication from the gastro-intestinal tract, and accomplishes the desired result with a minimum and exactly mensurable dosage. The objection to its systematic employment outside of hospitals is the need of a physician or an expert to administer the dose. The injection of mercury into the deep muscular tissue (the gluteus in its thickest part, with the muscle wholly relaxed; the trapezius above the upper

¹ Trans. Internat. Derm. Cong., London, p. 376.

² Die Behandlung der Syphilis mit subcutaner Sublimat-injektion. Berlin, 1869.

scapular angle, with equal lack of tension), as well as when practised more strictly hypodermatically, requires all antiseptic precautions both as to the point where the needle is inserted and as to the instrument itself. These injections occasionally have proved fatal (calomel, gray oil); grave mischief has followed in several instances from visceral troubles; and the attacks of syncope which result in certain cases from these injections have presented alarming and even dangerous features.

The technique of mercurial injections is of importance. A syringe of the capacity of not less than 2 c.c., constructed wholly of glass and armed with irido-platinum needles, is used. The operation is conducted with strict aseptic precautions. The patient, when the intramuscular injection is being given, preferably lies prone, though other postures are advised. The needle is plunged vertically into the deep part selected—post-trochanteric fossa (Smirnoff); intersection of a horizontal line two finger-breadths above the great trochanter and of a vertical line separating the inner third of the buttock from the outer two-thirds (Galliot); or the middle of a line connecting the anterior superior spinous process and the base of the coccyx.

Among the soluble salts of mercury employed for injection, all of which are best administered intramuscularly, the most popular and efficient are the bichlorid, the biniodid, and the benzoate. Corrosive sublimate may be administered in dosage of $\frac{1}{12}$ (0.005), $\frac{1}{8}$ (0.006), $\frac{1}{4}$ (0.016) grain or more daily, or preferably every second day, in periods of about twenty injections each. Many formulæ have been suggested, for example the following of Staub, the result of the experimental work of Hepp:

R—Hydrarg. chlorid. corros.,	gr. xviii;	1	20
Ammon. chlorid.,	gr. xvii;	1	20
Sod. chlorid.,	℥j;	4	
Aq. dest.,	f℥iv;	120	M.
Dissolve, filter, and add the white of one egg in distilled water sufficient to make ℥iv (120.). 15 minims of the solution contain about $\frac{1}{12}$ of a grain (0.005) of the sublimate.			

Lewin's formula is as follows:

R—Hydrarg. chlorid.,	gr. xxiv;	1	5
Sodii corros. chlorid.,	gr. xvj;	1	
Aq. dest.,	℥iiijss;	100	
Fifteen minims (1.) or more may be employed.			

A simple and convenient method of employing the bichlorid of mercury is to make a 1 per cent. solution of the salt in normal salt solution. Fifteen minims of this are used in the first, 20 in the second, and subsequently 25 (or more) at each injection, the latter dosage representing $\frac{1}{4}$ of a grain of the salt.

Other soluble salts employed are the succinamide, cyanid, oxy-cyanid, cacodylate, iodo-cacodylate, peptonate, and lactate.

Gottheil¹ recommends the following formulæ:

R—Hydrarg. iodidi rubri,	gr. j;	0.06
Sodii iodidi,	gr. j;	0.06
Aq. dest.,	℥iv;	15
R—Hydrarg. benzoatis,	gr. j;	0.06
Sodii chloridi,	gr. j;	0.06
Aq. dest.,	℥iv;	15

Of the first of the above, 10 minims may be administered at each injection, and of the latter 10 or more may also be employed.

Fournier² says of the biniodid that it is an active and well-tolerated salt, but is inferior in its therapeutic results to calomel or gray oil.

Of the insoluble salts of mercury, the preparations used most extensively are calomel, gray oil, and basic salicylate.

Metallic mercury was introduced as an intramuscular injection by Lang, of Vienna, and consisted of mercury in a finely subdivided form suspended in liquid fat (oleum cinereum), which contained 40 per cent. of the metal. Lang's modified formula (cited by Lambkin, loc. cit.) consists of metallic mercury, 2 parts; sterilized anhydrous lanolin, 1 part; and sterilized liquid paraffin, 1 part. Of this preparation each dose should consist of $\frac{2}{3}$ of a grain of mercury.

A formula endorsed by Lambkin, which is claimed to be painless, consists of:

R—Hydrarg. pur.,	℥ijss;	10
Creosote absolut.,	℥ijss;	10
Acid. camphoris,	℥ijss;	10
Palmitin,	q. s. ad. ℥ijss;	100

Ten minims represent 1 grain of metallic mercury.

All metallic mercurial preparations are warmed before using.

Calomel is administered in suspension in vaselin oil, olive oil, mucilage and water, or glycerin and water, and is given in 1 grain dosage. It may be used with creosote and camphor, as above suggested for metallic mercury, and is stated to be less painful.

The insoluble salicylate of mercury, while, according to many authorities, less efficient than metallic mercury or calomel, is extensively employed and may be prepared as follows:

R—Hydrarg. salicylat.,	gr. xv-xxiv;	1.50
Mucil. acac.,	gr. viij;	.533
Aq. dest.,	f ℥vss;	165 M.

A Pravaz syringe of the above is the usual dose. A popular and simple method is to have it prepared as a suspension in liquid albolene.³

¹ Modern Treatment. Hare, 1911, ii, p. 115.

² Cited by Lambkin: A system of Syphilis. Power and Murphy, 1908, ii, p. 236.

³ Gottheil, Jour. Amer. Med. Assoc., 1907, xlix, p. 365: Ten Years' Experience in the Treatment of Syphilis by Intramuscular Injections of Insoluble Mercurials.

A pure preparation of this drug is thoroughly mixed in a mortar with liquid albolene, using all necessary precautions as to cleanliness, and is placed in one-ounce, wide-mouth bottles, the whole then being sterilized, after which it may be kept for some time and used as necessary. Either a 10 or 20 per cent. suspension is prepared, of which a quantity representing $\frac{1}{2}$ to 1 grain is administered. Ten minims of a 10 per cent. suspension represents 1 grain of the salt.

The technique for its administration may be as follows: A sterile glass syringe of the capacity of 2 c.c. (or 30 minims), with an iridoplatinum needle of good caliber and at least $1\frac{1}{4}$ inches in length, is necessary. The injection may be given with the patient standing or in the recumbent position. The area on the buttock above outlined is thoroughly cleansed, and the needle after sterilization is filled with sterile liquid albolene and plunged into the muscular tissue. The syringe is then detached, leaving the needle *in situ* for sixty or more seconds. At the end of this period, if no bleeding occurs through the needle, the syringe, containing the proper amount of the suspension, is reattached and the contents injected. As injection of the material into a vein might be followed by unpleasant consequences, the above technique is necessary. If bleeding occurs through the needle, it indicates the presence of the latter in a vein, in which case it must be withdrawn and a new site selected. The emulsion is to be thoroughly shaken during the waiting period immediately preceding its injection, to insure a perfect suspension. The injection is practically painless at the time, but is followed for a day or two by a feeling suggestive of a bruise. Slight induration may follow if some of the injected material escapes into the subcutaneous tissue. As a rule, this can be avoided. The injections are employed usually once weekly and on alternate sides of the body.

Intravenous injections of mercury have been employed, but not at all generally. The salts thus used are the bichlorid, the biniodid, the cyanid, and the benzoate. The method was introduced in 1893, by Baccelli. Pernet¹ states that the method is especially effective in syphilitic diseases of the eye. Lydston² believes that in forty-eight hours a patient may be brought completely under the influence of mercury by intravenous injections (15 to 25 minims of a 2 per cent. solution of the bichlorid of mercury). Ten cases are reported improved. The median basilic or median cephalic vein in the forearm was selected, care being taken to place the needle fully within the lumen of the vein and to remove the tourniquet before the discharge of the mercurial solution from the syringe. By this method a rapid effect is produced, but its disadvantages outweigh the advantages, according to most authorities. Heidingsfeld³ recommends the intravenous injection of the oxycyanid of mercury in salvarsan relapses, in dilution of 1 to 1000, and in doses of 0.02 grain.

¹ Brit. Med. Jour., November 30, 1897.

² Jour. Amer. Med. Assoc., 1907, xlix, p. 1662.

³ Amer. Jour. Urology, 1912, viii, No. 8.

Ptyalism, stomatitis, fetor of the breath, or a fungous condition of the gums, with inappetence and other characteristic symptoms of the ill-effects of mercury, including all grades of gastro-intestinal disturbance, are seen rarely in modern practice, and they should never occur in a properly regulated mercurial course. When they are produced, the tongue is usually tumid, and exhibits at its lateral borders the imprints of the inner faces of the molar teeth. Its surface is also covered in various degrees with a thin, dirty-grayish coat; and the odor of the breath is peculiarly offensive, being often noticeable at a distance of several feet from the patient. In such cases the food should be liquid and nutritious, both hot and cold drinks should scrupulously be avoided, and the mouth should frequently be cleansed with washes containing dilute liquor sodæ chlorinatæ, potassium chlorate, or a weak solution of phenol. In particularly severe cases, potassium chlorate may be employed to the extent of 1 drachm (4.) daily. The compressed tablets of this salt, each containing 5 grains (0.33), may be slowly dissolved in the mouth. The mercurial is to be suspended in all such cases, and iced water is to be interdicted, as gangrene has followed its use in a few instances. In milder forms tincture of myrrh and cinchona, diluted with sweetened water, or honey and water, will be sufficient for local medication of the mouth. Iodoform in pill form, each pill containing 1 grain, may be employed three times daily, allowing the pill to remain and slowly dissolve in the mouth before swallowing; or the iodized phenol, well diluted (15 drops in a wineglassful of water), may be used.

The Iodids.—Potassium and sodium iodid are the preparations commonly employed. The iodids of ammonium, rubidium and strontium are less effective. Iodipin (Merck) and lipiodol (Lafay) are iodinated oils and are employed both by mouth and by injection. The iodids possess some value, without question, in every stage of syphilis, and are therefore indiscriminately used by some practitioners. Their value lies chiefly in the late manifestations of the disease, and their use should be largely restricted to this period. While they apparently have no specific effect on the organism that produces the disease, their value in removing indurations and nodules and in the healing of gummatous and other ulcers is incontestable. The value of the drug is enhanced by the administration at the same time of a mercurial, such combination being known as the "mixed treatment." Potassium iodid may be given in doses of from 5 grains (0.33) to 1 to 2 drachms (4.-8.), well diluted with water (a gobletful, preferably), three or four times daily, one hour after eating. The larger dosage should, as a rule, be reached gradually. That small dosage will frequently accomplish the result was early brought out by Hutchinson, and later emphasized by Hartzell.¹ A common method of administering the drug is to begin with 5 grains and increase 1 grain at each dose until the desired end is attained.

¹ Therapeutic Gazette, May 16, 1898.

At times large dosage may be necessary to accomplish the result in obstinate cases. Not infrequently its administration is better tolerated if it be given in a glassful of milk. When the desired result has been accomplished, viz., the removal of nodular deposits or healing of ulcers, the dosage should be largely reduced, and at a subsequent period the drug stopped altogether and the treatment carried on with mercury.

Symptoms of iodism other than the production of cutaneous lesions, such as coryza, edema of the eyelids, abdominal tension and tenderness, and faucial irritation, are often the result of the first few doses of iodine ingested, and these symptoms may bear no relation to the size of the dose. In certain cases 1 or 2 grains (0.066–0.133) will be sufficient to produce the most disagreeable effects, which, if they occur before the remedy be suspended, may not return with even the largest doses. In a few cases potassium iodid produces violent toxic effects in any dose, owing to exceptional idiosyncrasy.

The following are indications for the use of potassium iodid, either alone or by the so-called "mixed method," in the treatment of syphiloderma: the occurrence (1) of nodular, gummatous, or ulcerative lesions; (2) of formidable nervous, visceral, or other non-cutaneous lesions, with early or late, mild or severe, syphiloderma, as, for example, grave ulcerations of the velum or the fauces, with a symmetrical macular eruption, or coincidence of a generalized pustular or papular syphiloderm, with hemiplegic, aphasic, ocular, or renal complications; (3) of manifestations which either assume the so-called "galloping" type, being succeeded rapidly by more and more formidable symptoms, or which exhibit the capriciousness of the disease in a reversal of the usual sequence of evolution; as, for example, when symptoms commonly described as late phenomena occur within a few weeks after infection and are followed by the early symmetrical rashes; (4) of early or late symptoms occurring in cachectic, strumous, or otherwise debilitated patients.¹

Sodium iodid may be used in the same manner as potassium iodid, and appears to have less irritating effects on the stomach. Ammonium and lithium iodid possess also, without question, some influence over the disease, but they are in most cases less efficacious than the potassium and sodium salts. When given in combination with the biniodid of mercury, the syrup of licorice may be used as a part of the vehicle, which makes a more pleasant preparation to take. For example, the following formula may be employed:

R—Hydrarg. iodid. rubri.,	gr. ss-ij;	0.033–0.133
Potassii iodid.,	ʒij-ʒj;	8–30
Syrup glycyrrhiz.,	ʒij;	60
Aq. dest.,	q. s. ad. ʒiv;	120

¹ Cf. chapter devoted to Salvarsan.

The common method of administering potassium iodid and the bichlorid of mercury is in combination with the syrup of sarsaparilla, one formula being as follows:

R—Hydrarg. chlorid. corros.,	gr. iij;	20
Potassium iodid.,	℥v;	20
Aqua,	℥v;	20
Syrup of sarsp.,	q. s. ad. ℥viij;	240

Local Treatment.¹—The local treatment of the initial sclerosis of syphilis by complete excision, lauded by Auspitz, has been practised (since the date of his paper in 1879) by Kölliker, Zeissl, Leloir, Chadznski, Mauriac, and others. The result has proved that, as a rule, such operative interference furnishes no bar to constitutional infection. Simultaneous extirpation of all lymphatic glands in the vicinity of an initial sclerosis, with ablation of the latter and a mass of tissue about it, has repeatedly proven unavailing to prevent the occurrence of systemic infection. More recently, excision has again been advocated by Hoffmann, Neisser, Hallopeau, and others. It is suggested by Fordyce² that when situated on the foreskin the chancre may be advantageously removed; but the major portion of observers believe that no special benefit is derived from its excision, as the infection very soon passes beyond the limits of the local lesion. Chancres should not be destroyed by caustic agents of any character, as the caustics are likely to induce either irritative or inflammatory effects, which may be followed by denser induration. Ointments, as a rule, are always objectionable, exception being made in the case of hemorrhagic lesions, when the removal of an adherent dressing is followed by unpleasant consequences. Cleanliness with soap and water is of chief importance. Thorough cleansing with a solution of boric acid or a 1 to 2000 solution of the bichlorid of mercury, followed by dusting the parts with a dry powder, such as euophen, iodol, zinc stearate, calomel, hydro-naphtol, or boric acid, is advised; or the lesion may be dressed with a piece of soft lint, saturated in pure or dilute lotio nigra, or, even better, a spirit-lotion containing tannin and phenol, or boric acid. Opiated washes or iodoform (which is an anesthetic for many ulcerative surfaces) may be requisite in painful and ulcerating lesions.

When the primary lesion becomes phagedenic or gangrenous, or, even in the absence of both these calamities, extends rapidly in depth or superficial area, cauterization should not be practised. The most effectual treatment of these complications in the genital region is by the employment of the continuous hot-water bath, aided by asepsis. The patient remains seated in the bath (the water being of the temperature most grateful to the affected surface and with great care maintained at that degree of heat) throughout the day, or, in formidable emergencies, if carefully watched, by day and night. The bath is left

¹ Cf. chapter devoted to *Salvarsan*.

² Trans. Amer. Med. Assoc., Sec. on Derm., 1912, p. 114.

by the patient only for the purpose of evacuating the bladder or the rectum. Granulation and repair gradually ensue. Whenever the patient leaves the water the parts are dusted with iodoform or with iodol. By this invaluable means, in both hospital and private practice, cicatrization of extensive ulcers which extend from the genital to the pubic region may be secured.

Local treatment of the syphilodermata may be demanded either by reason of their appearance on exposed surfaces, as on the face and hands, or by reason of their obstinacy or threatening character, as when they are rapidly ulcerating. Macular and papular lesions of the face may be treated by local applications of mercury: 5 per cent. oleate; mercurial ointment, 1 to 2 drachms (4.-8.) to the ounce (30.) of cold-cream salve or of vaselin; red oxid, from 2 to 4 grains (0.133-0.266) to the ounce (30.); or white precipitate, $\frac{1}{2}$ to 1 scruple (0.66-1.33) to the ounce (30.) of ointment. Lotions of bichlorid, 1 to 2 grains (0.06-0.133) to the ounce (30.) of cologne, are also efficient. These preparations are more effective if applied before retiring and left upon the lesions during the night, and each is best preceded by hot bathing of the surface for several minutes, as in the preparatory treatment of acne papulosa. The sulphur preparations employed for the relief of the latter disease will at times be found useful also in the local treatment of the syphilodermata.

Hot ablution is particularly useful in the treatment of the scaling and frequently fissured lesions of the palms and soles, the pain of the local symptoms in severe cases being greatly alleviated by this treatment. After the epidermis in these parts has been well macerated, the hands or the feet should be thoroughly dried and the mercurial, tarry, or other salve be well rubbed in. The medicated mulls and plasters are here of value. A glove or a stocking should then be drawn over the part.

Secreting condylomata, flat papules, and vegetations, also require bathing with soap and water, especially when situated at the mucous outlets of the body or on the scalp. When the secretion is offensive in odor, formalin, boric acid, or phenol, thymol, or chlorinated soda should be added to the lotion. Cleanliness, indeed, is more essential to the syphilitic patient than to the healthy. After the cleansing or disinfecting ablution, the parts may require penciling with the crayon or with solutions of silver nitrate, 10 to 20 grains (0.66-1.33) to the ounce, and may then be dressed with a powder, such as dry calomel, euophen, iodoform, iodol, hydro-naphtol, bismuth subnitrate, zinc oxid, sodium salicylate, or starch. Vegetating lesions of these regions may also require penciling with a crayon of silver nitrate. Ointments are decidedly objectionable local applications.

Crusted and ulcerative lesions, large or small, are to be treated in accordance with general principles. Crusts should always be removed, either by the oil and soap-and-water treatment or with a dermal curette, after which removal the underlying ulcers should be cleansed, thoroughly penciled with silver nitrate, filled with powdered boric acid, iodoform, iodol, or calomel, or touched with a 5 to 20 per cent.

solution of mercuric nitrate, 1 to 2 drachms (4.-8.) to the ounce (30.). Large syphilitic ulcers are often encountered on the surface of the lower extremities, and in this situation elastic compression by a rubber bandage will greatly accelerate their cicatrization. Ointments of ammoniated mercury, compound iodine ointment, and those containing the yellow oxide are useful in many cases. The mercurial, salicylated, zinc-oxide, and other plasters are required for infiltrations.

The syphilodermata are in general amenable to the action of the mercurial vapor-bath, which exerts upon them both a local and a constitutional influence. Those affecting the face are benefited thus by exposure to the metallic vapor in the "head-piece" arrangement already described. The patient also may avail himself less comfortably of the same local treatment by holding the breath and exposing the head and face for a few minutes at a time to the fumes of the mercury beneath the blanket, in the plan described as practicable at the bedside.

The syphilodermata, if treated locally by the measures described as useful in non-syphilitic cutaneous affections of similar type, will commonly proceed to a satisfactory involution if the general treatment be skillfully ordered.

The local treatment of syphilitic lesions of the mucous surfaces is both hygienic and medicinal. Catarrhal conditions of adjacent mucous surfaces (oral and nasal cavities, vagina) require attention. The parts should be kept free from all irritation (tobacco in all forms, iced and hot articles of food and drink, condiments, acetous and alcoholic fluids in the mouth; coitus and irritating injections of the vulva; napkins that have been soiled over the ano-genital regions of infants). Locally, the silver-nitrate crayon is effective in the management of moist patches, applied once daily or every second or third day. Occasionally, stronger caustics are required, such as mercuric nitrate or nitric acid. Mouth-washes containing potassium chlorate, myrrh, and honey; 15 to 20 drops in water of Bellamy's iodized phenol; milk of magnesia; very dilute lotions of tincture of ferric chloride; or dilute hydrochloric acid, a teaspoonful to a pint of sweetened water; and carbolated washes, are required in different cases. In very great soreness and tenderness of the mouth, only the blandest applications are tolerated, such as thin flaxseed-tea, oatmeal gruel as a wash, and gum-acacia water. A few formulæ are appended:

R—Potass. chlorat.,	3j;	4	
Mel. depurat.,			
Tinct. myrrh.,	āā 3ss;	15	
Aq. dest.,	ad. 3vj;	ad. 180.	M.
Sig.—A teaspoonful in water as a wash for the mouth and throat.			
R—Phenolis,	3j;	4	
Glycerin.,			
Tinct. iodine.,	āā 3ss;	āā 2	
Alcoholis,	3ij;	8	
Aq. dest.,	ad. 3j;	ad. 30	M.
Sig.—Fifteen to 20 drops in water as a lotion for the mouth.			
R—Potass. chlorat.,	3j;	4	
Aq. menth. piperit.,	āā 3vj;	āā 180	M.
Sig.—Gargle and wash for the mouth; to be used slightly diluted.			

Salvarsan ("606," *Dioxydiamido-arseno-benzene-dihydro-chlorid*, $C_{12}H_{12}N_2O_2As_2 \cdot 2HCl + 2H_2O$).¹—Salvarsan is a yellow powder, soluble in water, and has a strongly acid reaction. It is furnished in ampules, each containing a single dose, ranging from 0.1 gramme to 3.0 grammes. Exposure to air causes deterioration and the formation of toxic substances, so that each ampule should be tested before use to determine possible defects. Salvarsan is very extensively used in the treatment of syphilis today and largely recognized as a potent agent in combatting the disease. Uniformity of opinion as to the method of its employment does not exist. For the relief of the clinical manifestations of the disease it has shown unusual capabilities, but the dangers attending its use must be borne in mind, though these have been largely eliminated through improvement in technique and a careful study of the causes of these untoward effects.

The drug has arsenic as its active base, and was elaborated through scientific research by Ehrlich and his associates in their endeavor to obtain a remedial agent fulfilling the ideal "*therapia magna sterilisan*." While the ideal was not achieved with respect to syphilis, the drug has assumed a position of importance in the treatment of the disease.

Methods of Administration.—The subcutaneous administration of Salvarsan method, which was largely employed early, has been entirely abandoned, owing to its accompanying disadvantages. Among these was pain of more or less serious character at the time of its administration, and it not infrequently was followed by the formation of long-continued indurations and abscesses. Intramuscular injections with the drug in solution, or as an emulsion in an oil, were more successful, were attended with fewer unpleasant after-effects, and were used largely for some time. Some authorities still use this form of injection in certain instances, and believe the method to be more safe than the intravenous method, which is now being employed almost exclusively.

Intramuscular Method.—Salvarsan may be given in solution intramuscularly, but is preferably incorporated in an oil, several of which have been recommended. A simple and convenient method is to place the required dosage of salvarsan in a small, sterile glass mortar and add to this 2 c.c. of iodopin or other oil. This is thoroughly ground with a pestle until a perfectly smooth emulsion is made. The emulsion

¹ For reports expressing views on the use, dangers, efficiency, etc., of salvarsan, see Ehrlich, Hata, *Chemotherapy* (translated by Newbold, revised by Felkin); MacKee *Med. Jour.*, New York, October 21, 1911: A comparison of the Results Obtained by the Intravenous Administration of Acid and Alkaline Solutions of Salvarsan. Brocq, *Annales*, December, 1912, iii, p. 669: Present Use of Salvarsan. Swift, *Trans. Amer. Med. Assoc., Sec. on Derm.*, 1912, p. 101: Anaphylaxis to Salvarsan. Fordyce, *ibid.*, p. 114: The Administration of Salvarsan in Syphilis. Post, *ibid.*, p. 141: The Proper Places of Mercury and Salvarsan in the Treatment of Syphilis. Howard Fox, *ibid.*, p. 154: The Relative Value of Mercury and Salvarsan from a Serologic Point of View; Nichols (*Jour. Amer. Med. Assoc.*, 1912, lviii, p. 603) The Present Status of Salvarsan Therapy in Syphilis. Keyes, *Jour. Cut. Dis.*, 1912, xxx, p. 420: Notes on Salvarsan. Finger, *Wein. klin. Wochenschr.*, 1913, No. 15: Mercury and Salvarsan. Pusey, *Amer. Jour. Med. Sci.*, 1913, cxlvi, p. 497: The Present Situation in Syphilis. Leredde and Jamin, *Bull. Soc. Franc. Derm.*, 1914, p. 91; *ibid.*, 1914, p. 267. Dangers of Salvarsan Disappear after First Injections.

is then drawn up into a glass syringe, and one-half of the contents injected into each side of the gluteal region. Before the injection, the skin should be cleansed and the area painted with tincture of iodine. An irido-platinum needle, No. 19, $1\frac{1}{2}$ inches in length, should be employed. The technique outlined for giving insoluble salts of mercury should be followed here, in order to avoid getting the salvarsan into a vein. No immediate reaction occurs from this method, but both local and systemic symptoms of varying grades are sometimes noted from the third to the sixth day or from the eighth to the eleventh day—local swelling and induration, with pain, tenderness, and elevation of the temperature, and at times a chill, nausea, and vomiting. All of these subside soon without sequels except local induration, which is also absorbed in time.

Intravenous Administration.—Freshly distilled water is essential for the solution of the drug, as water that has been kept any length of time becomes contaminated, and even though sterilized at the time of use the products of dead microorganisms produce unpleasant symptoms in the presence of salvarsan. Freshly prepared sodium hydroxid solution is also necessary, as well as sterile 0.5 per cent. saline solution, prepared with chemically pure sodium chlorid and freshly distilled water. A narrow-necked, graduated, glass-stoppered, sterile cylinder measure of 300 c.c. capacity is used, into which 30 to 40 c.c. of sterile distilled water are placed, after which 0.5 salvarsan is added and vigorously shaken until it goes into solution. To this solution approximately 19 drops of 15 per cent. sodium hydroxid solution is added, drop by drop. A precipitate forms, which is gradually redissolved. Care should be taken to use just enough of the caustic-soda solution to make a perfect solution. This produces a clear yellow solution, to which sufficient sterile 0.5 per cent. saline solution is added to make a total of 250 c.c. Each 50 c.c. of this solution contains 0.1 gramme of salvarsan. A smaller amount of the 0.5 per cent. saline solution may be added if desired, making the total quantity of fluid injected 180 c.c. in place of 250 c.c.

Many varieties of apparatus for injecting salvarsan intravenously have been devised. A simple method is to use a Whitall-Tatum Company percolator, small size, Oldberg type, capacity 250 c.c., to which $3\frac{1}{2}$ feet of rubber tubing is attached. The latter should be heavy and with a small lumen. A small window is placed two inches from the end by inserting a glass tube. A needle of the size recommended for intramuscular injections may be employed, but this should not have a long, sharpened point. At the time of the injection the patient should be in a reclining position. After the skin of the arm at the elbow has been thoroughly cleansed, a tourniquet is applied to the middle of the arm, thus distending the veins. A small amount of saline solution or distilled water is placed in the percolator and allowed to fill the tube and needle. The latter is then inserted into the lumen of the vein and as soon as blood is seen in the window the tourniquet is removed and the solution allowed to flow in. When certain that the sterile water

is flowing properly into the vein, the salvarsan is placed in the percolator and allowed to pass through, following which another small amount of sterile water is used. It is entirely unnecessary to make incisions over the vein, as it can practically always be entered in the manner above described. The gravity infusion method is strongly urged, rather than injection by means of a syringe.

Neosalvarsan is a yellowish powder, readily soluble in water, the solution having a neutral reaction. It contains as the active constituent dioxydiamido-arseno-benzene-mono-methane-sulphate of sodium ($C_{12}H_{11}O_2As_2N_2CH_2O SO Na$) with inorganic salts. It is furnished in glass ampules, each containing a single dose, ranging from 0.15 gramme to 4.5 grammes. Neosalvarsan contains 21 per cent. of arsenic, while salvarsan contains 31 per cent. In comparison, therefore, 0.9 gramme of the former is equivalent to 0.6 of the latter.

Originally, it was recommended to dissolve each 0.15 gramme of the preparation in 25 c.c. of freshly distilled water for intravenous injections. Ravaut¹ reduced the amount of water to 10 c.c. for 0.9 gramme, and he has been followed by many in the use of concentrated solutions.² No untoward results have been recorded from this method. The technique of its administration is that described for salvarsan.

In a certain percentage of cases reactions occur, usually following the first injection, and are exhibited in the following symptoms in varying degrees, these usually appearing within a few hours and clearing up in twenty-four hours: elevation of temperature, averaging about 100° F., rarely rising as high as 104° F.; headache; nausea, alone or with vomiting; diarrhea; and varying cutaneous eruptions, such as scarlatiniform and morbilliform erythema, urticaria, and bullous and herpetic eruptions.

Extended observation appears to prove salvarsan to be more efficient than neosalvarsan,³ but attended with slightly more dangerous possibilities. The ease with which neosalvarsan goes into solution renders the technique of its administration less liable to contamination; but it is always necessary to use the preparation immediately after it is made into a solution, on account of its unstable character. If kept for any length of time, oxidation occurs and poisonous products may be formed.

Precautions.—A careful chemical and microscopical examination of the urine should precede each injection. Salvarsan should be administered in small dosage in all cases exhibiting disease of the kidney, liver, heart, lungs, circulatory or nervous systems, and avoided if these disorders are grave. Alcoholics require careful watching and small dosage. Idiosyncrasy is a factor.

¹ Annales, April, 1913, p. 206.

² Beeson, Jour. Amer. Med. Assoc., 1914, lxii, p. 508 (a good review of methods of administration of Neosalvarsan, as observed in Paris).

³ Whitehouse and Clark, Jour. Cut. Dis., 1913, xxxi, p. 633: Salvarsan and Neosalvarsan in Syphilis: A Comparative Study.

Indications.—When contra-indications are not present, salvarsan is recommended in early syphilis, before the appearance of the general eruptive manifestations; in distinctly ulcerative lesions; in resistant palmar and plantar eruptions; and in malignant syphilis. It has a marked effect on the clinical symptoms that occur on the skin and in the mucous membranes. After a single (or not more than two or three) injections, most lesions disappear within ten to fourteen days. When used early, before the Wassermann reaction becomes positive, the disease has not infrequently been aborted; at least, in the cases so reported, no symptoms have developed, nor has the Wassermann become positive after periods ranging up to three years. In certain of these the Wassermann became temporarily positive, but this condition soon disappeared, and subsequently the result of the test remained negative. Most observers, therefore, who use the preparations insist on their employment at the earliest possible moment.

Mucous-membrane lesions appear especially susceptible to the action of these drugs, which therefore assume an important rôle not only in relieving the patient of disagreeable symptoms, but of rendering him less of a menace to his fellows. With older methods, in certain cases, the symptoms were obstinate, resisting treatment over long periods of time; but it is rare for any such group of symptoms to resist more than two injections of salvarsan. In rapidly destructive lesions of the nose and throat, where deformity will result as tissues of vital importance are invaded, and in ulcerative lesions elsewhere, brilliant results usually follow the use of these preparations. In certain cases of persistent lesions involving the palms and soles, salvarsan is of value, as it usually clears up these symptoms in a comparatively short time. In old cases, recognized chiefly by the presence of a positive Wassermann reaction, its effects are not so brilliant; many reporters demonstrating the fact that even after several injections no particular change is made.

In the general treatment of the disease marked diversity of opinion exists, the major portion of practitioners using a combination of salvarsan and mercury. In a large series of cases treated in the British Army by Gibbard and Harrison,¹ best results were obtained with two injections, each of 0.6 gramme of salvarsan, followed by nine intramuscular injections of mercury, prolonged over a period of nine or ten weeks. Fordyce² states that in the early stages three or four doses of salvarsan, supplemented by mercury, will in many cases eradicate the disease in from six months to one year. These conclusions have been confirmed by a large number of other observers. Morris and McCormac³ suggest in early cases excision of the primary lesion, and in the absence of contra-indications an intravenous injection of salvarsan, accompanied by a mercurial course. After a few days a second injection of salvarsan should be given; and if after a short interval the Wasser-

¹ *Trans. xvii Internat. Cong. of Med., London, 1913, Sec. xiii, Part I, p. 145.*

² *Trans. Amer. Med. Assoc., 1912, Sec. on Derm., p. 114.*

³ *Trans. XVII Internat. Cong. of Med., London, 1913, Part 2, p. 241.*

mann reaction is still positive, a third. In all cases they recommend the administration of mercury with intermissions for two years. McDonagh¹ recommends in the primary stage about four injections, and in the stage of general infection about seven, and states that in the late stages fifteen or more may fail to procure a negative Wassermann reaction.

In view of the fact that only in exceptional instances has the removal of the disease been accomplished with a single injection of salvarsan, its employment in small doses is being urged more and more. By this method the tolerance of the patient can be ascertained and the toxic action of the drug largely overcome; the clinical manifestations of the disease cleared up quickly (in most instances); and the drug may be given over a longer period of time and ultimately in larger quantities with safety and with better chances of completely eradicating the disease. In a recent contribution, Fordyce² states that in early lesions the best results are obtained by giving salvarsan in a series of from four to six injections, at intervals of about ten days, combining it with intramuscular injections of mercury salicylate at weekly intervals, and following the salvarsan series by eight or ten intramuscular injections of mercury. At the end of this course of treatment, a month's interval should elapse, when the series of salvarsan and mercury injections should be repeated. Two or more such courses of treatment may be required in early syphilis before the Wassermann reaction is influenced.

Certain observers use the drugs salvarsan and mercury alternately during the first year, dividing the time into periods, or regulating the treatment according to the indications presented, either clinically or serologically. Wechselmann³ believes the use of salvarsan following intensive treatment with mercury to be dangerous. Neisser⁴ states that the combined use of salvarsan and mercury is more efficient than either alone, and, contrary to the opinion of Wechselmann, without danger.

Leredde⁵ advises salvarsan as early as possible. He begins with a small initial dose, 0.2 of neosalvarsan, and gives eight injections, covering a period of about two months, increasing the dosage gradually at each succeeding injection up to 1.2 grammes or more. After a rest of about six weeks, if the Wassermann reaction is positive, a second series of about six injections is similarly given. After a second rest, if the reaction is negative, a provocative injection of salvarsan is given, after which the Wassermann is repeated and a spinal puncture made and the spinal fluid examined for albumin, globulin, and lymphocytes, followed by a final Wassermann test. He emphasizes

¹ Trans. xvii Internat. Cong. of Med., London, 1913, Part 2, p. 273.

² Jour. Cut. Dis., 1914, xxxii, p. 1.

³ The Pathogenesis of Salvarsan Fatalities. Berlin, 1913. English translation by Martin, p. 143.

⁴ Trans. xvii Internat. Cong. of Med., London, 1913, Part 2, p. 233.

⁵ Bull. Soc. Franc. Derm., May, 1914, p. 267: New Researches in Sterilization.

the importance of the reactivation injection and the subsequent examinations above mentioned, deeming a negative Wassermann reaction of the blood insufficient evidence of the eradication of the infection.

Untoward Results.—Recent investigation of the literature shows fewer unfortunate results following the use of salvarsan, while the total number treated is greatly increased.¹ Improvement in technique, better regulation of the size of the dosage, its use combined with that of mercury, and, finally, a better understanding of the contra-indications, are the factors effecting this change.

The important untoward results recorded are, in addition to the transitory reactions described above, peripheral neuritis, nephritis, injurious effects on the auditory and, more rarely, on the ocular apparatus, a more active involvement of the nervous system in cases only partially relieved by salvarsan (neuro-recurrences), and, finally, hemorrhagic encephalitis and death.

The treatment of inherited syphilis is mainly that of the acquired form, with such modifications as are required by the tender age of the subject of the disease and by the special character of the eruptive and other symptoms in the infant or child. The mother who is demonstrably the subject of the disease requires antisypilitic treatment during any pregnancy where there is possibility of taint of the product of conception. This is especially important in pregnancies succeeding those terminating either in abortion or in the birth of a syphilitic child. The infant born of a syphilitic mother or of two luetic parents should be spared specific medication until evidences of infection are presented, seeing that in some cases the fetus and new-born infant escape even when lues is made probable by the antecedents of the progenitors. The syphilitic child, when the disease is inherited, should be kept at the breast of the mother and not be suckled by any other woman. All syphilitic infants require special provision for their nutrition; cod-liver oil is generally indicated. Inunction, using 10 to 30 grains of mercurial ointment, is to be practised by anointing the swathing-band with a strong or modified mercurial salve, the motions of the child being in general sufficient to insure a proper medication by introduction of the medicament. As the skin of the abdominal surface in these young patients is generally sensitive, care should be taken to suspend the application of the unguent and to apply a dusting-powder until any resulting dermatitis is relieved.

Internally, calomel or the gray powder, $\frac{1}{10}$ of a grain to 1 grain (0.006–0.06), may be applied to the tongue after trituration with the sugar of milk. Potassium or sodium iodid is indicated in the cases presenting nodular, gummatous, or ulcerative lesions. The potassium salt must be given in doses of from $\frac{1}{10}$ to 2 or 4 grains (0.006 to 0.133–0.266), administered in solution three times daily,

¹ Leredde, Bull. Soc. Franc. Derm., February, 1914, p. 91: Dangers of Salvarsan Disappear after the First Injections.

or oftener when required. Iron is indicated generally, and in particular the iodid of iron, which may be given in the form of syrup, 2 to 5 drops in solution. The dosage is to be varied with the age and vigor of the child. Lesions of the mucous surfaces (mouth, anus, nares) require special hygienic care, and the use of lotions of boric acid, formalin, chlorinated soda, and, in especial, soap and water, is desirable. These should be followed often, particularly about the ano-genital region, with the application of dusting-powders. The eruptive symptoms in inherited syphilis are to be treated like those in the acquired disease, due care being taken to protect the tender skin from irritation. The tars and stronger mercurial salves should not be employed over the skins of very young infants.

Salvarsan and neosalvarsan¹ have been largely used in congenital syphilis with good results. As in the adult form, an absolute technique has not been developed. The combination of a mercurial has been proven to be most efficacious. The technique also is similar to that employed in the adult, and usually comprises two or three injections, given at intervals of about two weeks, the dosage being about 0.01 gramme of salvarsan per kilo of body-weight. This is to be followed by inunctions or injections of mercury for several months, at the end of which time, in case activity is shown by the presence of a positive Wassermann or otherwise, the treatment is repeated.

Prophylaxis.—By a series of carefully controlled experiments, Metchnikoff and Roux demonstrated the fact that syphilis may be aborted if a strong calomel ointment (calomel 20, lanolin 40 parts) be thoroughly applied to the site of inoculation within a period of six hours. The value of this measure in the prevention of syphilis has been abundantly demonstrated in the medical service of the armies of Great Britain, the United States, and other countries.

Prognosis.²—The duration and probable outcome of the various syphilodermata have been suggested in connection with the description of the lesions. As a rule, but little difficulty is experienced in clearing up the clinical manifestations. The former exceptions to this rule, which included particularly mucous-membrane lesions, those involving the palms and soles, and rarely other lesions, are now largely overcome by the use of salvarsan. It may be said, therefore, that with judicious treatment on the part of the physician and with complete coöperation on the part of the patient, the disorder, so far as cutaneous symptoms are concerned, may be with rare exceptions, entirely eradicated.

The prognosis relative to ultimate cure of the general disease in acquired syphilis may also be said to be good. The proportion of cases in which a Wassermann reaction remains positive is not known, nor is the significance of such a condition entirely understood. In the larger proportion of cases the patient may be placed in a condition where he is

¹ Cf. Boardman, *Jour. Cut. Dis.*, August, 1914, xxxii, p. 545 (Syphilitic Heredity and Congenital Syphilis), for discussion of salvarsan treatment and references.

² Cf. Keyes, *Jour. Cut. Dis.*, 1910, xxviii, p. 449: Some Elements in the Prognosis of Acquired Syphilis.

not liable to relapses, and is unable to communicate the disease to others or transmit it to his offspring.

Hereditary syphilis, on the other hand, is more grave, and, as stated in the description of symptoms, the earlier the manifestations appear after birth, the more grave the prognosis. Many children, however, with proper treatment and hygienic care, make complete recoveries, with no recurrences.

LEPRA.¹

Synonyms.—Leprosy, Satyriasis, Elephantiasis Græcorum, Leontiasis, Lepra Arabum. Fr., Lèpre, Ladrerie; Ger., Aussatz; Norweg., Spedalskhed.

Definition.—Leprosy is a chronic, contagious, and infectious disease, produced by the *Bacillus lepræ* and characterized by cutaneous and constitutional symptoms, producing various deformities and mutilations of the human economy, and usually ending fatally.²

Leprosy is believed to have originated in the Orient and to be as old as the records of history. Together with a group of dermatoses, probably of a different nature, it was recorded in the Hebrew Scriptures.³ Once prominent in the list of scourges of the Old World, its prevalence today is restricted. From the second to the seventh century it was abundant in Europe. Galen, in the second century, writes of it in France, Germany, and Spain. In the eleventh and twelfth centuries

¹ Danielssen and Boeck, *Traité de la Spedalskhed*, etc. (with atlas), Paris, 1848. A. Hansen, *Archiv*, 1871; *Cong. méd. de Soc. méd. de Copenhagen*, 1884. Van Dyke Carter, *Leprosy*, etc., 1874. Jones, *New Orleans Med. and Surg. Jour.*, March, 1878. Solomon, *Trans. Louisiana State Med. Assoc.*, 1879. Bemiss, *New Orleans Med. and Surg. Jour.*, 1880, n. s., vii, p. 923. Barnes, *Arch. of Med.*, December, 1881, vi, p. 201. Leloir, *Traité de Lèpre* (planches), Paris, 1886. Morrow, *Jour. Cut. Dis.*, 1889, vii, p. 147, and *Twentieth Century Practice*, xv, p. 403. D. W. Montgomery, *Jour. Amer. Med. Assoc.*, 1894, xxiii, p. 136, and *Med. Record*, 1902 (spontaneous cure in a leper family). Unna, *Internat. Cong. of Derm.*, London, 1896: Zambaco, *Leprosy, and Syphilis*; *Lepra-Conferenz*, Berlin, October, 1897 (three volumes, full bibliography). Dyer, *Phila. Med. Jour.*, 1898, ii, p. 567. Bracken, *Minnesota State Board of Health*, 1901, and *Phila. Med. Jour.*, 1898, ii, p. 1309. Santon, "La Leprose," Paris, 1901 (plates). Victor Babes, "Die Lepra," Wien, 1901 (68 illustrations, 8 colored plates, and bibliography to date). McDonald, T. Jonathan, *Jour. Amer. Med. Assoc.*, 1903, xl, p. 1567 (examination of 150 cases in Hawaii). Campana, *Lepra*, 3d ed., 1907. Wheery, *Jour. Infec. Dis.*, 1908, v, p. 507; *Jour. Amer. Med. Assoc.*, 1908, i, p. 1903. MacLeod, *Brit. Jour. Derm.*, 1909, xxi, p. 309. Dyer and Hopkins, *Jour. Amer. Med. Assoc.*, 1910, lv, p. 909 (*Diagnosis of Leprosy*). Unna, *Trans. II Internat. Sci. Cong. on Leprosy*, Bergen, August 16–19, 1909; *Annales*, October, 1910, p. 481 (abstr. *Brit. Jour. Derm.*, 1911, xxiii, p. 164). Gurd and Duval, *Jour. Cut. Dis.*, 1911, xxix, p. 274 (*Experimental Leprosy and its Bearing on Serum Therapy*). Currie, Clegg and Hollman, *Public Health Bull.*, No. 47, U. S. Marine Hosp. Service, September, 1911, p. 3; abstr. *Jour. Cut. Dis.*, 1912, xxx, p. 752 (*Studies upon Leprosy; Cultivation of the Bacillus of Leprosy*). Abstr. *ibid.*, p. 23 (*Attempt at Specific Therapy in Leprosy*). Zinsser and Carey, *Jour. Amer. Med. Assoc.*, 1912, lviii, p. 692 (*A Contribution to the Study of Rat Leprosy*). Smith and Rivas, *New Orleans Med. and Surg. Jour.*, October, 1912, lxxv, p. 265 (*Cultural and Biological Characteristics of the Lepra Bacillus*). Dyer, *Jour. Amer. Med. Assoc.*, 1913, lxi, p. 950 (*The Dermatologic Aspects of Leprosy*).

² Ormsby, *Reference Handbook of the Medical Sciences*, p. 484.

³ McEwen, *The Biblical World*, No. 3, September, 1911: *The Leprosy of the Bible in its Medical Aspects*; *ibid.*, No. 5, 1911: *The Leprosy of the Bible in its Religious Aspects*.

it spread all over Europe. In the fourteenth century it began to decline, and by the end of the seventeenth century it was to be found in only a few isolated localities. Early in the sixteenth century it had nearly disappeared from Italy, and somewhat later from France. At this time Denmark was free. It remained in Scotland for some time after leaving England, the last case being reported in the Shetland Islands in the latter part of the eighteenth century. During the last century it made its appearance and spread in new localities. About the middle of the century it was introduced into the Hawaiian Islands, where a serious epidemic prevailed. Morrow affirms that here, as in other newly-infected districts, the disease was at first quickly fatal and was usually of the nodular type, but of late years it has been less serious, and the milder or maculo-anesthetic type is the more prevalent.

At present leprosy is common in Iceland; throughout the whole of Asia, including the islands of the Indian Ocean; in South America, especially in Columbia, Venezuela, the Guianas, and Paraguay;¹ in Mexico, Central America, the West Indian Islands, particularly Cuba, and in the islands of the Pacific Ocean. It is found also throughout Africa, being more abundant throughout North and South Africa than in other portions of that continent. In Australia the disease is found chiefly in Queensland, New South Wales, and Victoria (Castellani). It is also found in Spain, Portugal, Italy, Turkey, Greece, the islands of Crete and Cyprus, the Balkans, Norway, Sweden, Russia; and to a variable degree in France, Germany, Denmark, Belgium, Holland, and Austria-Hungary. It also occurs in the province of New Brunswick, in Canada. In England and Scotland, where it once was prevalent, it is now among the rarest of diseases. The disease is represented also, in what is reported as a diminishing frequency, in the dependencies of the United States—the Hawaiian Islands, Porto Rico, and the Philippine Islands.

In the United States² the disease first appeared in Louisiana, in Minnesota³ and other Northwestern States (where it was imported from the Scandinavian Peninsula), and also to a lesser degree in South Carolina. At present it is chiefly found in South Carolina, Florida, Louisiana, Texas, California, Minnesota, Wisconsin, and Iowa. Isolated cases occur in all the larger cities, including New York, Boston, Philadelphia, Chicago, and San Francisco. It is variously estimated that the number of lepers in this country is between 250 and 500. In 1902, a report made by a commission of medical officers of the United States Marine Hospital Service to the United States Senate stated that there were 278 cases. In view of the difficulty

¹ Lindsay (Brit. Med. Jour., September 21, 1912, p. 682) states that in Paraguay the disease is rapidly spreading at the present time.

² Pollitzer, Jour. Cut. Dis., 1911, xxix, p. 261: Historical Sketch of Leprosy in the United States (a good description of the history of the disease in the United States, the present geographical distribution, and the probable number of cases).

³ Boeckmann (Jour. Amer. Med. Assoc., lxi, 1913, p. 946) states that the old imported cases of leprosy are gradually dying, and at the present time there remain but few cases.

of obtaining reliable statistics, it is thought by most observers that at the present time the number is much greater than the above report would indicate.

Symptoms.—The disorder has been described as occurring in several forms. Danielssen and Boeck described these as the nodular and the anesthetic. The terms *Lepra tuberosa* and *Lepra maculo-anesthetica*, as adopted by Hansen and Looft,¹ seem more acceptable, as they more nearly express the condition. While as a rule each affection runs its special course and is marked by symptoms so entirely different from those belonging to the other as to make it appear a distinct disease, yet

FIG. 212



Lepra. (Howard Morrow.)

some cases exhibit symptoms which are common to both forms, and in these the relationship is evident. They have a common etiological factor, the *Bacillus lepræ*, which, however, is in a different anatomical location and varies as to numbers in the two forms.

As in the case of other contagious and infectious diseases, the clinical history may be divided into stages. The period of incubation has been studied by competent observers and cannot be said to have a definite length. It is estimated to extend from a period of a few

¹ Leprosy in its Clinical and Pathological Aspects. English translation by Walker, London, 1895.

weeks to many years. Before the eruptive and characteristic stage develops, various prodromal symptoms such as may precede any infectious disease occur. Among these may be mentioned fever, chilliness, malaise, headache, gastro-intestinal disturbance, epistaxis, mental depression, drowsiness, insomnia, pains in the limbs, and various anomalies of the motor and sensory apparatus, especially in the limbs. As above stated, these symptoms may occur for but a few weeks before the eruptive manifestations, or they may be present for years.

Lepros Tuberosa (*Tubercular, Nodular, or Tegumentary Leprosy*).—From 10 to 50 per cent. of all cases of leprosy are of the nodular type, the

FIG. 213



Leproma of ocular globe. Epithelial horn pointing upward from eye. (Howard Morrow.)

larger proportion apparently holding good for colder climates. This type appears first as a macular eruption, of varying persistence, which may come and go, but in which finally the skin becomes infiltrated with characteristic nodules. The macules are well defined, round, oval, or irregular in shape, and vary in diameter from 1 to 10 cm. or more. Dependent upon the race of the patient, the color varies from a light-red to a purplish or bronze shade. The lesions may appear slightly elevated or infiltrated, or quite smooth and shiny, and somewhat hyperesthetic. Sooner or later, these patches become permanent and infiltrated with nodules, which are pea-sized, yellowish- or reddish-brown in hue, and enlarge more or less rapidly, some of them becoming

as large as a walnut or larger. Their surface presents a shining appearance, as if varnished or oiled, and the skin may be soft and natural, or present slight desquamation. They may be grouped, forming areas of roundish or irregular contour, or may be isolated. By fusion broad infiltrations are formed, from the surface of which new nodules spring. These may be either cutaneous or subcutaneous in situation, and are softish or firm to the touch. The development of these lesions is not limited to the site of the previous macules, for some appear on

FIG. 214



Leprosy. (Howard Morrow.)

apparently normal skin, and their efflorescence is preceded by febrile symptoms more or less severe. Their development is not one of gradual progress, but rather of successive crops, each new efflorescence being preceded by febrile symptoms and the appearance of epistaxis. The lesions are often in various grades anesthetic.

The site of predilection of leprosy nodules is the face, and their massing in great numbers upon this region produces the characteristic deformity of countenance which has given the disease one of its names,

Leontiasis ("face of a lion"). In such faces the nodules are arranged in parallel series above the brows, down the nose, over the cheeks, the lips, and the chin. In consequence of the infiltration and development of the lesions, the brows deeply overhang the globes of the eyes, the eyelids become affected with partial ptosis, the lips pout, and the ears are so studded with nodular masses as to project from the side of the head. Unna¹ says that the lobe of the ear is a favorite and early site. The lesions are also frequently found on the forearms, thighs, and other portions of the extremities. To a lesser degree they are found on the trunk, but only on rare occasions do they occur on the palms. Involvement of the palm has been noted by Montgomery,² Stelwagon,³ and the author.⁴ Occasionally, with extensive development of nodules upon the face and ears, there may not be more

FIG. 215



Leprosy. (Howard Morrow.)

than from five to fifty upon the rest of the body, and these may be either widely dispersed and isolated, or agglomerated in a single hard, flat, elevated plaque of infiltration upon the elbow or thigh. When confluence of nodules occurs, large plaques of infiltration may form (*lépromes en nappe*, Leloir), which are elevated and brownish or blackish in shade (*morphea nigra*). These patches are inert, lasting sometimes for years unchanged. They may be the seat of itching, or the normal sensations may become less acute. The hair falls in the involved regions, which may finally ulcerate. According to Danielssen and Boeck, these large plaques generally occur on the limbs and undergo an unusually chronic course. The nodules may degenerate into irregularly outlined, sharply cut, glazed

ulcers, with a hemorrhagic or sloughing floor, some of which, especially under appropriate treatment, heal soon; while others extend deeply, often become gangrenous, and destroy much tissue. Other nodules undergo resorption and disappear, leaving pigmented, atrophic depressions; or they may lose their shape in consequence of partial resorption. A large plaque not infrequently is absorbed centrally, leaving an annular disk.

The appendages of the skin show some involvement. Alopecia, particularly of the brows and eyelashes, usually occurs, but the scalp is rarely attacked. Occasionally, the nutrition of the nails is destroyed,

¹ Histopathology, p. 604.

² Jour. Cut. Dis., 1899, xvii, p. 445.

³ Diseases of the Skin, 7th ed., 1914, p. 922.

⁴ Case demonstration before the Thirty-eighth Annual Meeting of the Amer. Derm. Assoc., 1914.

evidenced by thinning, thickening, or other deformity. The secretions of the sebaceous and coil-glands are increased early in the disease, but later become diminished or entirely lost in the affected area. Comparatively early in the disease, small, flattish nodules form on the conjunctiva and cornea, extending to and involving the iris, and gradually filling the anterior chamber.

According to Hillis,¹ patches having raised, concentric edges, situated on the back of the pharynx and on the roof of the mouth, the back of the throat and the uvula, which are uniformly red and congested, are pathognomonic of leprosy. Later, the epiglottis, vocal cords, and other structures in the larynx become studded with nodules, as does also the nasal septum; and when ulceration occurs the cartilage and bony framework of the nose are destroyed, producing a characteristic deformity. Morrow believes that the earliest manifestations of leprosy in most cases are located in the mucous membrane of the pharynx and upper air-passages, as shown by alterations in the voice, rhinitis, increased nasal and salivary secretions, and sometimes epistaxis.

Danielssen and Boeck have described an acute form of leprosy, manifested by continuous fever of about twelve days' duration, when, with a sudden efflorescence, raised, shiny, bluish spots appear over large surfaces of the body. These rapidly increase in volume and hardness, become confluent, and progress as far in a few weeks as does the ordinary form in years. With the appearance of the eruption the constitutional symptoms abate and the affection becomes chronic.

As a rule, the course of the disease is exceedingly slow, and years may elapse before the several changes above described are accomplished. The malady often appears to be quiescent for months at a time, after which, with the occurrence of fever, acute or subacute manifestations appear, which may be accompanied by relatively rapid ulcerative processes, followed by gangrene, in which case the disease may progress rapidly toward a fatal conclusion.

Lepros Maculo-Anæsthetica.—This form of the disease is more common in tropical than in cold countries. In this variety the bacilli are located chiefly in the neuroglia of the peripheral nerves, and consequently the symptoms exhibited in the part supplied by the affected nerves are those which would naturally follow their irritation, compression, or degeneration. Chief among these are the development of spots or macules, bullæ, muscular atrophy, anesthesia, motor paralysis, and finally mutilation by loss of parts. There is no regular sequence observed in the evolution of these symptoms. Usually, however, the maculæ and bullæ are among the earliest manifestations, but their appearance may be delayed for years.

The course of this form of the disease is exceedingly chronic, its average duration being estimated at about eighteen years. The appearance of the macules is usually preceded by anomalies of sensa-

¹ Leprosy in British Guiana, 1881.

tion, such as formication, a sensation of burning or stinging, or itching. The size of the lesion varies from that of a fifty-cent piece to that of the palm or larger. By peripheral extension and coalescence, large, irregular areas, having a curved contour, may be produced. At first they are reddish in color, changing with age to yellowish or brown, or even darker shades, when they tend to become slightly elevated and to desquamate. Their centres become depigmented and anesthetic, while the border may be hyperpigmented and hyperesthetic. Their commonest seats are usually considered to be the back, shoulders, face, arms (especially about the elbows), the nates, and around the knees. When the spots are fully developed, they may cover large areas of the cutaneous surface. In the anesthetic portion, and at times extending beyond it, the production of sweat is entirely sup-

FIG. 216



Leprosy maculo-anesthetica.

pressed and the hairs become white. The formation of bullæ is characteristic, and they may be the initial symptom, in which case they usually occur on the extremities, may be numerous, and are frequently hyperesthetic. The older are often single, large, and may be anesthetic. They appear suddenly, and if short-lived, which is the rule, have serous contents, the latter becoming purulent when the lesions persist. They heal after rupture, leaving a pale, anesthetic scar, or, by infection, develop into deep-seated ulcers.

When the nerve-trunks are the seat of severe neuritis, they become thickened and can be readily felt by the finger of the examiner. The fusiform enlargement of the ulnar nerve behind the olecranon process at the elbow is characteristic. Scheube calls particular attention to the involvement of the great auricular nerve, which, according to Bälz (quoted by Scheube), occurs in 90 per cent. of all cases. Other

nerves especially involved may be the tibial, perineal, and, less often, the radial, median, brachial, and cervical.

Atrophic changes are noticed first in the interosseous muscles of the hands, the thenar and hypothenar being the next involved, the atrophy extending thence up to and involving the muscles of the forearms. In the hand this produces the "lepra claw," in which the

FIG. 217



Anesthetic leprosy, with mutilating results. (From a photograph of a leper in the Sandwich Islands.)

proximal phalanges are extended, while the middle and distal are more or less flexed. Many other muscles are similarly involved.

Trophic disturbances through nerve-involvement are illustrated in the perforating ulcer of the foot and in the deep and destructive processes occurring in the fingers and toes. Hansen and Looft regard these changes as being largely due to external injury to a part of low vitality.

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Leprosy maculo-anesthetic.

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The ulcers are irregular, oval, roundish, or linear in outline; covered with thin, blackish, flattened, tenacious crusts; and anesthetic. The phalanges of the feet and hands may be attacked with necrosis, when complete exfoliation of the bone occurs. The fingers and toes may thus disappear, leaving only soft processes, upon which the relic of a nail remains. Owing to the lack of unguent from its glands, the skin becomes dry and fissured and the seat of ulceration. To this stage of the disease the term *Lepra mutilans* was formerly applied.

From the foregoing description of the clinical course of the disease, with its subjective symptoms and objective lesions, it would seem that typical cases in the two forms are very different. The difference, however, is due to the selection of the skin in the one case for the growth of the organism, and of the nerves in the other. The so-called nodular variety frequently terminates in the maculo-anesthetic form; occasionally, the reverse is true; and in practically all cases of the nodular variety some anesthesia is present. The variety described under the heading of mixed forms simply indicates the development of nodules in a case formerly presenting symptoms of the maculo-anesthetic type; or anesthesia and other trophic disturbances following in the course of a nodular case. It is best, therefore, to look upon the expressions of the disease as exhibited in regard to the complexus of symptoms presented in syphilis. In each case there is a single morbid principle. There are in both no true varieties, and the external symptoms depend entirely upon the localization of the causative factors of the disease.

Etiology.—The chief factors concerned in the etiology of leprosy, in view of the fact that the disorder is known to be produced by the bacillus discovered by Hansen, are the mode of invasion of the parasite, and the degree of contagiousness of the disease. In ancient and medieval times leprosy was considered very contagious. In 1809, however, the Royal College of Physicians declared against this theory; but Hansen and Looft quote statistics and give undeniable proof of the contagiousness of the disease in Norway. G. Thin¹ quotes a large number of cases in which leprosy was undoubtedly contracted by contagion. Among other examples, Morrow² quotes the case of Father Damien, a priest whose personal and family history bore no taint of previous disease, but who, after close contact with lepers in the Hawaiian Islands in a leper settlement, contracted the disease. Its development in new countries, or in new localities in the same country, can usually be proven to have been produced by contagion. The contagiousness is not marked, and it requires the closest relationship between the leprosy and the healthy before the disease can be contracted. The Leprosy Commission in India, in 1893, reported that leprosy in India cannot be considered an hereditary disease, and stated that the evidence which exists is hardly sufficient to establish, to an appreciable degree, an hereditary predisposition to the disease in the

¹ Leprosy, London, 1891.

² A System of Genito-Urinary Disease, Syphilology and Dermatology, iii, p. 562.

offspring of leprous patients. Besnier says that if any hereditary predisposition exists, it is less than in tuberculosis.

As to its mode of transmission from one person to another, different opinions prevail. Thin¹ believes that close personal contact is usually necessary; but that the possibility of infection being carried by an intermediate host, such as the mosquito or the acarus, is not unreasonable. Currie² concluded, after a series of experiments, that mosquitoes do not transmit the disease, but that it may be transmitted by flies.

The rôle played by the bedbug in the transmission of leprosy is undetermined. Goodhue³ and Long⁴ have found tubercle bacilli in bedbugs which had recently fed on leprous subjects. Hansen and Looft quote cases in which the affection was carried by way of the clothing. Morrow believes that in the majority of instances the contagion gains entrance to the body through the mucous membranes of the respiratory and gastro-intestinal tracts. That it spreads from one person to another seems proven by the fact of its disappearance in a community when isolation is practised. Neisser says that the number of lepers in any community bears an inverse ratio to the care taken to insure the isolation of infected persons.

Leprosy may occur at any age, seldom, however, before the fifth year, and most often between the thirtieth and fiftieth years. Damp, cold climates, as well as moist, hot ones, are most favorable for its development. As predisposing factors, lack of hygiene, dirt, filth, and poverty undoubtedly play an important rôle.

Pathology.—Histologically, leprosy belongs to the group of granulomata. It is a neoplasm, made up largely of partially reverted connective-tissue cells. In this new-growth a specific bacillus is present in extraordinarily large numbers. This organism bears a striking resemblance to the bacillus of tuberculosis, both morphologically and as regards its staining reactions. It was discovered by Hansen, in 1874, and his observations were independently confirmed by Neisser, in 1879. It is somewhat thinner and a little longer than the tubercle bacillus, though variations occur. Its average length is from 5 to 6 microns. It frequently presents a beaded appearance, which has led some observers to believe that it exhibits spore-formation. Often in ordinary sections the whole area is seen to be crowded with the bacilli. They appear to be in groups, these usually being situated in large, ovoid cells, which constitute the lepra-cell. In the discharges from ulcers and diseased tissues, large numbers of bacilli are present, and the same tendency to grouping in ovoid masses is often noticeable. They are found in great numbers in the nodules of the tuberous variety, while in the macules of the maculo-anesthetic variety they appear in smaller numbers, but are numerous in the connective-tissue sheaths of the peripheral nerves. Successful inoculations of the lower

¹ Loc. cit.

² Public Health Bull., Washington, 1910; full abst. Jour. Tropical Med. and Hygiene, May 1, 1911, p. 138; abstr. Brit. Jour. Derm., 1911, xxiii, p. 334.

³ Boston Med. and Surg. Jour., 1906, cliv, p. 537.

⁴ Brit. Med. Jour., 1911, ii, p. 470; abstr. Jour. Amer. Med. Assoc., 1911, lvii, p. 1164.

animals and cultivation of the organism on artificial media outside of the human body have been made only comparatively recently. Campana claimed to have grown the organism in subcultures on glucose agar, but his observations were not confirmed. Important findings in this field have recently been made by Clegg and Duval. The former, in 1909, was successful in growing an acid-fast bacillus from leprous tissue on agar in symbiosis with amebæ. This organism had chromogenic properties.¹ Duval and Wellman² describe efficient methods for the cultivation of the lepra bacillus from tissues. They further state that different organisms seem to have been cultivated from these tissues: first, a non-acid-fast diphtheroid (Kedrowski); second, an acid-fast chromogenic bacillus (Clegg); and, third, a permanently acid-fast bacillus (Duval), which *in vitro* maintains the morphology and tinctorial properties of the Hansen bacillus of the tissues, but grows only in the presence of certain nutrients. From a bacteriological study of 29 cases, they report the cultivation of an acid-fast bacillus from 22. In 14 of these they found a chromogenic organism somewhat similar to that described by Clegg, which under certain conditions grows first as a non-acid-fast streptothrix; second, as a non-acid-fast diphtheroid; and, third, as an acid-fast bacillus. These characteristics, they believe, explain the interpretations of European writers in describing the *Bacillus lepræ* as a pleomorphic organism, which may be recognized as a diphtheroid, a streptothrix, or an acid-fast bacillus. In addition to the chromogenic organism, they isolated from eight cases an organism distinctly different in its biological character, growing only on special media and not producing pigment. Serological tests suggest that the bacillus of Clegg is not related to the non-chromogenic, slow-growing organism of Duval.

Successful animal experiments also have recently been abundantly reported. Duval³ injected 1 c.c. of a heavy homogeneous suspension of lepra bacillus into the subcutaneous tissues of the inguinal region of a full-grown Rhesus monkey, and after forty-six days the animal showed typical signs of disseminated infection and presented the clinical picture of human leprosy of the nodular type.

Diagnosis.—Apart from the history, present and previous places of residence of the subject of the disease, and the clinical symptoms exhibited, the diagnosis of lepra is to be established by the presence of lepra bacilli. These organisms may be recognized in the tissues, in serum obtained from involved regions, in blood made to exude from lepromatous nodules, in nasal discharges, and in the secretions of ulcers. In tissues the antiformin method may be employed for the discovery of the bacillus.

In the prodromal stages no suspicion of the existence of the disease would be awakened in countries where it is not endemic. In the

¹ Philippine Jour. of Sci., 1909, iv, p. 403; Duval, Jour. Exper. Med., 1911, xiii, p. 365.

² Jour. Amer. Med. Assoc., 1912, lviii, p. 1427, and Jour. Cut. Dis., 1912, xxx, p. 397.

³ University of Pennsylvania Med. Bull., p. 665; abstr. Brit. Jour. Derm., 1911, xiii, p. 300.

eruptive and later stages of the disorder, and particularly in well-marked cases, the recognition of the disease is simple.

From syphilis, which is also a disorder the lesions of which are polymorphic in character, lepra can be distinguished by its much greater chronicity; its larger and brownish-yellow, glazed nodules; its frequent paresthetic and anesthetic symptoms; its bullous lesions, rare in acquired syphilis; the far more extended areas of its erythematous macules; its blackish crusts, lacking the rupioid aspect of those in syphilis; its leathery, mica-tinted cicatrices; and the characteristic leonine facies of its nodular forms. As the Wassermann reaction is frequently positive in nodular leprosy, this method of diagnosis loses its value in the differentiation from syphilis.¹

Morphea and vitiligo are unattended by constitutional changes, and more particularly exhibit no hyperesthetic or anesthetic symptoms in the affected patches.

Multiple sarcomata, especially upon the face, are followed by much more rapid degeneration and fatal result.

All lesions of erythema multiforme can readily be distinguished from those of lepra by the absence of hyperesthesia or of anesthetic symptoms.

Syringomyelia is differentiated by its display of lesions only in regions where there is also muscular atrophy; by the much greater extent and lack of definition of areas of perturbed sensation; by diminution of the tendon reflexes, which may be exaggerated in lepra; by a marked predominance of symptoms in the upper as distinguished from the lower extremities; and by the frequent presence of scoliosis.

The nodules of lupus are not symmetrical, are far softer, and are much more often grouped than those of lepra. Further, they never have the size of the larger leprous nodules, and never have the peculiar pigmented, brownish, and oiled or varnished aspect of leprous nodules.

Prophylaxis.—As leprosy is unquestionably contagious, the question of the protection of the unaffected is important. Particular attention has been directed in America to this subject by J. C. White,² Hyde,³ Morrow,⁴ Dyer,⁵ and others. Recently the United States Public Health Service has directed much attention to the question of the spread of the disease and its prevention. According to Blue,⁶ there now exists a law preventing the immigration of patients suffering with

¹ Bruck and Gessner, Berlin klin. Wochenschr., 1909, xlv, p. 589; abstr. Jour. Cut. Dis., 1909, xxvii, p. 430 (Wassermann in Leprosy; 10 cases, 7 tubercular, 3 maculo-anesthetic; 5 positive and 5 negative, the positive all tubercular). Sequeira, Brit. Jour. Derm., 1911, xxiii, p. 190 (Wassermann Reaction in Leprosy; 2 cases, positive in one, negative in the other). Bloombergh, Philippine Jour. of Sci., October, 1911, vi, p. 335; abstr. Brit. Jour. Derm., 1912, xxiv, p. 160 (Wassermann Reaction in Syphilis, Leprosy, and Yaws. Reports that of 21 cases of leprosy 18 gave a positive reaction). Gilmour, Jour. Cut. Dis., 1913, xxxi, p. 426 (Case presentation; positive Wassermann).

² Trans. Internat. Lepra Convention, 1897, i.

³ Trans. Cong. Amer. Phys. and Surg., 1894, iii, p. 103.

⁴ Loc. cit.

⁵ Jour. Cut. Dis., 1911, xxix, p. 268.

⁶ Jour. Amer. Med. Assoc., 1913, lxi, p. 943.

the disease. He further states that provision for taking care of such patients has been made in Louisiana, Mississippi, and California. In Minnesota isolation of the patient at home is required. A few other States have some mention of the disease in their statutes; in a number of others nothing whatever has been done in regard to it. Blue suggests a national leper home, to be established under the Public Health Service, for the care and treatment of these unfortunates, as a humane solution of the problem of their care, and the limitation of the disease by the segregation of its victims.¹

Treatment.—Chaulmoogra oil has the highest reputation in the treatment of leprosy. This drug is obtained from the seeds of *Gynocardia odorata*, from which it should be obtained by cold expression. It is given in milk, in emulsion or in capsules, in doses varying from 15 to 200 or more mms. daily. It should be given over a long period of time in order to get best results. All observers agree as to its value. Gynocardic acid, its active principle, is administered as a salt in combination with either sodium or magnesium, in doses of $\frac{1}{4}$ to 3 grains (0.033–2.). The oil has also been injected subcutaneously in doses of 75 mm. (5.) daily. Strychnin is added to the oil with advantage in some cases.

Locally, inunction in affected areas with the oil, in connection with the internal administration, enhances its value. Crocker recommends injections of the bichlorid of mercury, $\frac{1}{4}$ grain (0.016) in 20 mm. of water, intramuscularly, twice weekly. This treatment has been found of value, particularly in the early stages. Radiotherapy has relieved the cutaneous symptoms, and, according to several writers (Malcolm Morris,² Wilkinson, myself and others), apparently has entirely cleared up the disorder. Phototherapy has been used occasionally with the same results.³

Among other preparations which have been of value, yet in the main disappointing, may be mentioned iodoform, in emulsion in olive oil, in the strength of 30 per cent., administered in daily subcutaneous injections, in dosage of from 2 to 8 c.c., continued over a period of six weeks (Diesling); gurjun oil, obtained from *Dipterocarpus levis*, emulsified, 1 part with 3 parts of limewater, given in $\frac{1}{2}$ ounce doses daily; ichthyol, 2 drachms (8.), given each twenty-four hours; the oil of cashew nut; the salicylates; mercury by mouth; arsenic, cod-liver oil, and the iodine compounds; Hoang-nan in pills of 3 grains (0.266); creosote in $\frac{1}{2}$ drop (0.033) doses; chrysarobin, pyrogallol, resorcin, salol, and extract of the thyroid gland. The value of the major portion of the above preparations must lie in the tonic effect they exercise on the patient in a general way. Serum- and vaccine-therapy neces-

¹ Cf. Rucker, Trans. Amer. Med. Assoc., Sec. on Derm., 1914, p. 34: The necessity for the establishment of a National Leprosarium; and Dyer, *ibid.*, p. 39: The Duty of the Government in Leprosy Care and Control.

² Brit. Jour. Derm., 1908, xx, p. 416. Heiser, Med. Record, October 31, 1908; abstr. Jour. Cut. Dis., 1909, xxvii, p. 275.

³ Pasini, Giorn. ital., 1907 (abstr. Brit. Jour. Derm., 1908, xx, p. 276); Morris (*loc. cit.*), and others.

sarily are in the experimental stage. The Carrasquilla serum (which is prepared by the injection of the blood of lepers into horses) and other sera have not been proven of value. A substance like tuberculin, prepared by Rost,¹ given by injection weekly, is reported to be of some value. Salvarsan has been given a trial with both favorable and negative results.² Montesanto³ obtained favorable results with large doses administered intravenously. Wellman⁴ obtained favorable results with salvarsan, and concludes that it may be administered to robust patients.

Nastin is a preparation elaborated by Deycke. It is a neutral fat obtained by making an ethereal extract of a streptothrix, which Deycke cultivated from cases of leprosy in Constantinople. The nastin is combined with benzol chlorid and made into ampules with sterilized olive oil and given as a hypodermic injection. It was claimed by the originator that it causes bacteriolysis and in suitable cases should be of value. As with other preparations, improvement and negative results have been obtained from its use. Deycke,⁵ Rudolph,⁶ Gottheil,⁷ and others report improvement. MacLeod⁸ used nastin without change and then substituted leprolin and obtained decided improvement. Teague,⁹ after using nastin in several cases without benefit, concludes that it is purely an empirical drug treatment and not a vaccine.

Wise¹⁰ used benzol chlorid in mineral oil with better results than were obtained with nastin.

The local treatment of leprosy is largely surgical, and is that outlined for the treatment of ulcers, and possibly the removal of deformed parts.

A review of the above outline of treatment demonstrates the fact that no remedies are known to have a directly curative effect in leprosy. As a consequence, the treatment of the disease is that suggested by the indications in each case. A change of residence, if the patient resides in a district where the disease prevails; the adoption of a highly nutritious diet; the administration of tonic remedies, including iron, quinin, cod-liver oil, and strychnia; and a rigid enforcement of

¹ Brit. Jour. Derm., 1908, xx, p. 90. In a discussion of cases presented by Crocker and Pernet, Rost stated that he had begun treating cases four years previously with this material and had obtained good results.

² Isaac, Senator and Benda (Berlin klin. Wochenschr., xlviii, No. 11, p. 470; abstr. Jour. Cut. Dis., 1911, xxix, p. 365) obtained negative results after two injections.

³ Münch. med. Wochenschr., lviii, No. 10, p. 511; abstr. Jour. Cut. Dis., 1911, xxix, p. 366.

⁴ New York Med. Jour., November 16, 1912, xcvi, p. 996; abstr. Jour. Cut. Dis., 1913, xxxi, p. 364.

⁵ Brit. Jour. Derm., 1910, xxii, p. 26 (a report on the Second Internat. Sci. Cong. on Leprosy, held at Bergen, August 16-19, 1909). In a discussion on the treatment of leprosy by nastin injections, several stated that they considered the employment of nastin of doubtful value.

⁶ Archivos Brasileiros de Medicina, June, 1912, No. 3; abstr. Brit. Jour. Derm., 1912, xxiv, p. 608.

⁷ Jour. Cut. Dis., 1911, xxix, p. 239.

⁸ Brit. Jour. Derm., 1912, xxiv, p. 229.

⁹ Philippine Jour. Sci., iv, No. 5, p. 329; abstr. Brit. Jour. Derm., 1912, xxiv, p. 371.

¹⁰ Jour. of London School of Tropical Medicine, 1911, p. 63; abstr. Brit. Jour. Derm., 1912, xxiv, p. 82.

appropriate hygiene, in connection with the internal and local use of chaulmoogra oil, offer the patient the best chance of keeping the disease under control.

Prognosis.—The future of the patient affected with leprosy is in general grave. The disorder is often malignant in character, and, however protracted, a fatal result usually occurs. With a change of climate and improved hygienic conditions much has been accomplished. The Scandinavian lepers who have emigrated to the United States have been benefited greatly by the change. This was the opinion of the late Professor Boeck, who studied the condition of leprosy patients who had come to this country from Norway. Cases of both maculo-anesthetic and tubercular leprosy concluding with complete recovery are now sufficiently numerous to suggest that with the advantage of all the facilities now at command for its management the future of these patients may be much more promising.

GRANULOMA FUNGOIDES.¹

Synonyms.—Mycosis Fungoides, Granuloma Sarcomatodes, Inflammatory Fungoid Neoplasm, Ulcerative Scrofuloderm, Eczema Tuberculatum, Fibroma Fungoides, Lymphodermia Perniciosa, Sarcomatosis Generalis. Fr., Lymphadénie cutanée.

This disease was described first in 1814 by Alibert as "Pian fungoïde," on account of its fancied resemblance to yaws; but later, in 1832, he gave it the name of mycosis fungoides, on account of the mushroom-like tumors which characterize it.

The disease is uncommon, though several hundred cases have been recorded in the literature. As it has been so thoroughly studied by a large number of competent observers all over the world, its train of symptoms places it as an entity.

Symptoms.—Granuloma fungoides presents a variety of lesions, exhibited as scaling patches, erythematous areas, papules, nodules, and tumors. It is usual to describe the disease as occurring in stages. The first stage presents lesions more or less evanescent in character, with little, if any, infiltration; the second is described as the stage of infiltration; and the third as the tumor stage. While many cases go through these three stages in their evolution, others exhibit only the last or tumor stage.

¹ **BIBLIOGRAPHY:** For further discussion of the subject, see in addition to the authors quoted in the text: Walters, *Bibliotheca Medica*, Abt. D. ii, H. 8, Stuttgart, 1899 (sixteen illustrations and complete bibliography); Leredde, *La Pratique Dermatologique*, t. iii, p. 527 (bibliography); Stowers, *Brit. Jour. Derm.*, 1903, xv, p. 47 (bibliography); Paltauf, Mraček, *Handbuch*, Wien, 1909, pp. 663-791 (critical review, with complete bibliography). Discussion on Mycosis Fungoides, opened by Sequeira, *Royal Soc. of Med.*, London, May 21 and June 4, 1914 (*Brit. Jour. Derm.*, 1914, xxvi, pp. 213 and 249; extensive bibliography); discussion by Pringle, Sir Malcolm Morris, McDonagh, Heath, Lancashire, Bolam, Nixon, Wills, Ward, Galloway, Stowers, Abraham, Whitfield, Pernet, Graham Little, Weber, MacLeod, Dore, and Travers Smith.

In the prefungoid (Morrow) or premycotic stage (erythematous period, Bazin; *stadium eczematosum*, Kaposi), a series of cutaneous phenomena of different types is noted. These conditions have been described as resembling eczema, lichen, erythema, pityriasis rubra, psoriasis, urticaria, furunculosis, and other congestive and inflammatory cutaneous affections. Hyde and Montgomery,¹ in a contribution based on a personal experience with thirteen cases, and a review of the literature of forty-eight cases in which these early phenomena were described, concluded, in common with a few other investigators, that these early dermatoses, though differing considerably in clinical type, have many characteristics in common and are the varied expressions of a definite morbid process; and preferred the term "prefungoid," employed by Morrow, to the generally accepted term "premycotic" for this stage. They were of the opinion that the disease itself was declared with the earliest pruritic symptoms, and that the skin-eruption is quite as significant of the disease as the tumors themselves.

The earliest phenomena vary greatly, and may closely imitate any of the above-named dermatoses. The most frequent lesions, however, occur in the form of round or circinate, sharply-defined, erythematous patches, psoriasiform plaques, or infiltrated disks, usually characterized by scaling and by itching. These areas are commonly from 2 to 6 cm. in diameter, but may be of any size, and in rare instances (as in one of the cases above referred to) the redness and scaling may be universal. Generalized vesiculation has also been noted. The lesions are usually dry, but at times may be moist and crusted, or even the seat of small papules and vesicles. In Hazen's case,² a number of the early lesions were follicular papules. The color varies through the different shades of red, orange-red, or scarlet, often combined with tints of brown or purple. As the lesions persist, thickening and infiltration of the skin are noted, and the patches become more sharply outlined, more distinctly circinate in contour, and, by extending peripherally while clearing in the centre, may either coalesce or begin to assume the gyrate and fantastic figures so characteristic of the disease. Itching is usually a pronounced feature, but may be absent. The course of the lesions is capricious. One or all of the patches may disappear suddenly and spontaneously, the eruption returning without apparent cause in old or new sites, and after intervals of days or months. This stage during which the patches may come and go may last a few months or several years (thirty, Dubreuilh) before the appearance of the more characteristic areas of infiltration.

In what may be called the second stage (period of infiltration, lichenoid period—Bazin, Vidal, Brocq, Fabre), circinate, sharply-defined, elevated plaques and nodules appear, either on the site of the previous lesions, independently of them, or concurrently with them. The

¹ Jour. Cut. Dis., 1899, xvii, p. 253.

² Strobel and Hazen, Jour. Cut. Dis., 1911, xxix, p. 147 (Report of a case in a negro, with thorough discussion of the relation of the disease to the sarcomata, lymphomata, and granulomata. Extensive pertinent bibliography).

nodules are pea-sized or larger; the infiltrated plaques are small-coin-sized to palm-sized or larger, sometimes extending over the greater portion of the chest, back or abdomen. The color varies from a bright-pink through varying shades of red, and occasionally of brown or violet. The surface may be smooth, verrucous, or fissured and excoriated as the result of scratching. The shape and career of these plaques are almost if not quite diagnostic. They are circular or circinate, as a rule, and as a result of an extending periphery and clearing centre they are constantly changing in both site and contour, often moving over the surface in gyrate bands or lines, or assuming half-moon, crescent, horseshoe, kidney, or other shapes, often fantastic and grotesque. While in many cases these variations in site

FIG. 218



Granuloma fungoides.

and form require several months for completion, cases not infrequently occur in which the whole aspect of the disease changes in a few days. In one of the patients above referred to, the lesions assumed the form of a curious network of connecting, broad, flat-topped ridges, between which were corresponding valleys of normally colored and apparently normal integument. Occasionally, these plaques may undergo ulceration, in which case the peculiar contour of the lesions strongly suggests a luetic infection. These lesions may disappear and reappear without apparent cause, as do the lesions of the so-called first stage of the disease. As a rule, on their disappearance, they leave no trace of their previous existence, but they may be followed by areas of more or less permanent pigmentation or of vitiligo. More rarely, circumscribed areas destitute of pigment and resembling vitiliginous patches may

occur in the skin where no preceding lesion has been observed. The symptoms of this period often occur with, or may be replaced by, those of the preceding stage. The first two periods together may last many years before the appearance of tumors, though in exceptional instances they may be preceded by tumor-formation.

The close resemblance of the lesions in the early stages to those of other diseases was emphasized in the case of a patient studied by the author, which was regarded for many years by well-qualified men

FIG. 219



Granuloma fungoides.

as parapsoriasis. Later, infiltrated plaques and tumors developed and the patient succumbed. Similar cases are recorded by Jamieson,¹ Hudelo and Gaston,² Sherwell, and Unna. While the psoriasiform plaques above described are usually the early expressions of the disease, true psoriasis may precede the disorder. Such a case was reported by Howard Fox.³

¹ Jour. Cut. Dis., 1901, xix, p. 440.

² Annales, 1904, s. iv, v, p. 1090.

³ Jour. Amer. Med. Assoc., August 13, 1913, lxi, p. 330 (Report of a case of granuloma fungoides, preceded for many years by true psoriasis; with review of the literature of cases presenting psoriasiform lesions).

In the third stage, the so-called fungoid state (mycofungoid, neoplastic period, cachectic stage (Stelwagon)), the characteristic tumors of the disease appear on the face, scalp, chest, arms, forearms, thighs, legs, back, upon the palmar and plantar surfaces, and, in fact, on any portion of the body. They are bean- to cocoanut-sized or

FIG. 220



Granuloma fungoides.

larger, whitish, pinkish, pale- or dull-reddish in hue, sessile or pedunculated, well rounded or lobulated, and distinctly circumscribed. They are covered usually, before ulcerating, with a dry, scaling or crusted epidermis. When developing from the plaques above described, they may be quite flat. They may spring from any of the previously described lesions or from the sound skin. Often, they are in various

degrees pigmented, showing purplish, brownish, or even black colors. They are usually painful, and may or may not be tender. The itching sensations of the more superficial lesions of the earlier stages may now be absent. When the tumors have attained maturity and before involution has begun, their appearance, especially upon the face, is characteristic. Here they are smooth, moderately firm, globular, often lobulated, or sausage-shaped, of a peculiar reddish hue, and when numerous produce a curious lepra-like deformity, closing the eyes in consequence of their size or weight, and producing the leonine brow and the elephantiasic ear. A patient with lesions conforming to those

FIG. 221



Granuloma fungoides. (Gue.)

described was studied by the author, in which case a close resemblance to sarcoma, both clinically and histologically, was noted.

Like the other lesions of this disease, the tumors may disappear spontaneously, while others appear; or they may all disappear, to return after uncertain intervals without known cause. As a rule, they leave no trace of their previous existence, though they may be followed by pigmentation or slight atrophy of the skin. Sooner or later, some of the tumors degenerate and lead to superficial ulceration, accompanied by adenopathy, usually followed by papillary excrescences and mushroom-like growths, of varying sizes, from which the disease

obtains its name. At the summit of these the hairs usually fall. Occasionally, much destruction through ulceration occurs, though with but few exceptions this destruction is limited to the new-growths; and even large fungoid and apparently deeply ulcerated tumors may disappear completely and leave no trace other than pigmentation and possibly a small atrophic scar. In a case representing the type *mycosis fungoides d'emblée*, a large tumor-mass grew over the tibia, which, after a short time, became a fungating mass and completely disappeared. At a later date new lesions occurred about the groins, abdomen, and other areas, and in this patient internal metastases were noted.

FIG. 222



Granuloma fungoides. (Gue.)

The general condition of the patient at first seems unaltered; later, when the tumors ulcerate, exhaustion occurs and the victim usually dies as the result of febrile processes, or of intercurrent disorders: pneumonia, tuberculosis, nephritis, leukemia, cachexia, or pyemia. When the tumors are many and the ulceration extensive, the appearance of the patient is repulsive in the extreme; the exhalations from the body are in the highest degree fetid, and the difficulty experienced in procuring proper hygienic care for the sufferer is well-nigh insurmountable. Extirpation of the tumors is usually followed by recurrence, frequently with added malignancy.

The superficial and deep lymphatic glands may enlarge, and this adenopathy, as in the case of the tumors, may subside, to be replaced later by similar involvement of the same or other glands.

The duration of the tumor stage is brief compared with that of the others; frequently death occurs within a few months, but it may be postponed for two or three years.

Etiology.—The disease is more frequent in men than in women, often in those of unusual weight and size; and usually occurs between the thirtieth and fiftieth years of life, most often after the fortieth year, though in a few instances it began earlier, even in childhood. Though the cause of the disorder is not known, there can be little question as to its infectious character. Various organisms, chiefly of pyogenic type, have been discovered, but they must be considered as secondary invaders. Inoculation experiments have been performed by many observers, including Stelwagon and Hatch,¹ with negative results. The disease is probably produced by a specific microorganism, but direct proof of contagion, or the demonstration, experimentally or otherwise, of such an organism, has not been made. With the dark-field illuminator the author has examined material from many lesions without success.

Pathology.—The disease has been studied by many observers, including ourselves. While the reports of different investigators apparently vary widely, a close study of the recorded observations indicates that in the main there is agreement. In a study of the early lesions, Hyde and Montgomery² found dilatation of the vessels and lymph-capillaries, with often some endothelial proliferation and a more or less dense cellular infiltration, which was limited usually to the upper part of the corium, except where it surrounded some of the deeper vessels in the form of sheaths or "cuffs." Galloway and MacLeod³ described in the early stages a connective-tissue-cell infiltration not only about the vessels, but also about the hair-follicles, the sebaceous glands, the muscles of the hair-pouch, the ducts of the coil-glands, and occasionally in the lymphatic spaces between the connective-tissue fibers. They concluded that the infiltration may originate in the cells of any of these structures. The infiltration in some instances is diffuse, but sharply separated from the deeper portions of the corium by a horizontal line, and from the rete above by a narrow layer of connective tissue. In other instances, the infiltration occurs in round or irregular areas, separated by bundles of normal connective tissue. Where the cells are most compact, they are supported by a very delicate fibrous structure made up in part of elastin. Degeneration of the collagen and elastin occurs in the late but not in the early stages of the disease. The cells forming the infiltration are in the main of the connective-tissue type, but in many cases they and their nuclei show the greatest diversity in size, shape, and staining qualities.

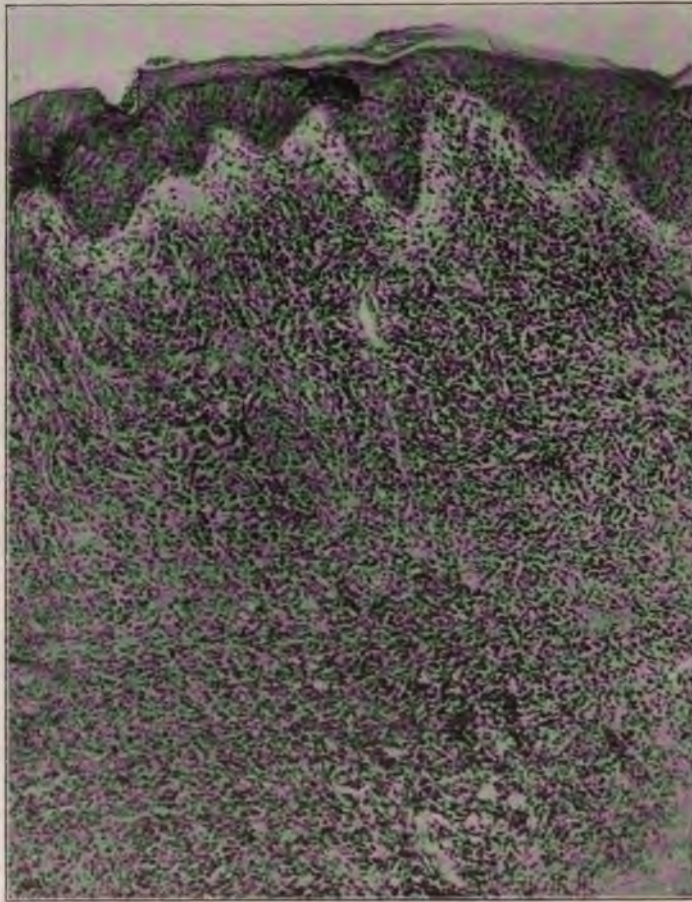
¹ Jour. Cut. Dis., 1892, x, p. 1.

² Brit. Jour. Derm., 1900, xii, pp. 153-187.

³ Loc. cit.

Round, cuboidal, or irregularly shaped cells, with little protoplasm and a deeply-staining nucleus, are numerous. Many of the irregular bodies are apparently fragments of cells. In many cases the cells are packed so closely as to modify their shape and size. This multi-formity of the cells is apparently characteristic of the disease, and

FIG. 223

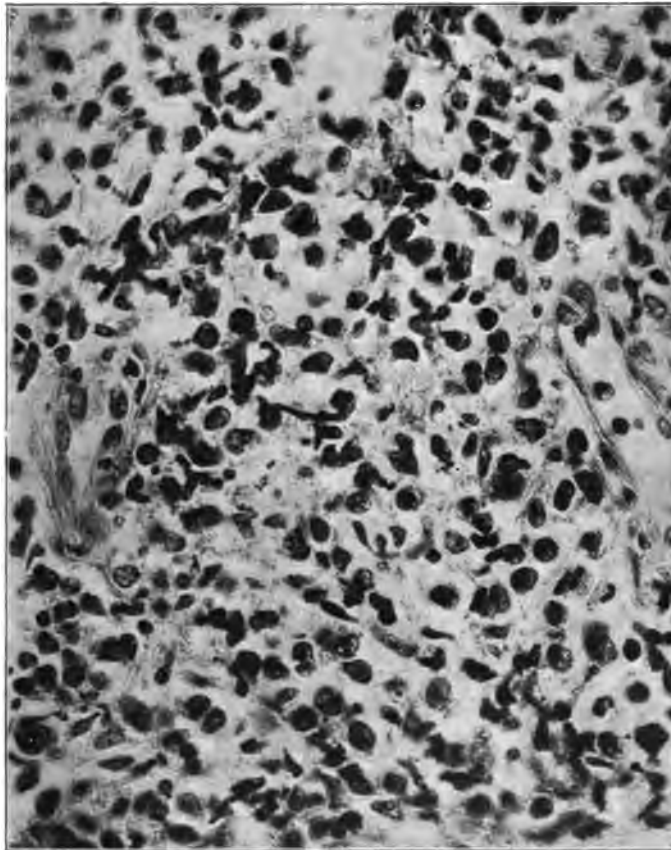


Granuloma fungoides. (C. J. White.) The section shows absence of the stratum granulosum and parakeratosis of the horny layer, and also character of the cellular invasion and absence of all structures in the corium except blood-vessels and cells.

Unna believes that it is the result of two antagonistic processes constantly going on: that is, cell-multiplication and cell-destruction; and that many of these odd forms are nothing more nor less than cell-fragments. Hazen states that the cells are of one type, and in his case they were lymphoid; and he further found pathological changes

in macroscopically normal skin. Mast-cells, mononuclear-cells, and giant-cells are seen in some of the lesions, but are absent in others. Mitotic figures are common. The papillæ are enlarged, in places packed with cells, in others more or less edematous, as also are portions of the subpapillary layer. The rete is everywhere hypertrophied, the

FIG. 224



Granuloma fungoides. (C. J. White.) Section of lesion from pubic region showing the nature of the cellular growth—i. e., lymphocytes, large and small; also the minimum amount of collagen present and the dilatation of the vessels. (Histologically, a round-cell sarcoma.)

interpapillary processes being elongated, broadened, and frequently branched. In places the cells are swollen and edematous, with spaces between them. Mitotic figures here also are numerous, especially in the basal layers. Wolters, in summing up the results of all investigations, states that no distinctly specific changes peculiar to the disease have been recognized.

As the lesions progress toward the tumor stage, the cells in the corium become more regular in form and size, and the rete becomes much thinner. In the fully developed tumors the rete is reduced to a few layers of cells, sometimes but one, but in some instances marked acanthosis is present. The cellular structure may now resemble the sarcomata, lymphomata, or granulomata. Tryb¹ says the cells in the early stages are of the connective-tissue type; later, there appear the transitional forms or connective-tissue round cells, chiefly of lymphoid variety, with horseshoe-shaped nuclei; and finally plasma-cells in the third stage. He regards the disease as an inflammatory process, that may, in the later stage, become a plasmoma. MacCormac² describes cells of indeterminate character, round, oval or irregular in shape, which were possibly lymphocytes and fibroblasts, and also a few plasma-cells. Stelwagon,³ in his study, found the tumor-cells to be lymphoid in type. Many of the tumors correspond closely in structure to sarcoma;⁴ others show the histological formation of the granulomata. Bosellini⁵ concludes that the disease represents a type of infectious granuloma of the skin, with visceral lymphoid changes. Nanti⁶ regards the disease as an inflammatory cutaneous disorder, rather than neoplastic, approaching the granulomata in type.

Numerous microorganisms have been seen in the blood and tissues and some have been cultivated, but none has been demonstrated to have any pathogenic relation to the disease. Among them may be named streptococci in the capillaries of granulation-nodules, and staphylococci in cultures from blood. Other examinations of blood, of infected tissue, and of tumors have been wholly negative as to the discovery of causative organisms. Wolters agrees with other observers that the organisms recognized and cultivated are in general the results of secondary infection, and bear no etiological relation to the disorder.

The disease has been considered as a form of sarcoma. The facts, however, that the fully developed tumor disappears spontaneously, and that in but few instances has involvement of the viscera been reported in granuloma fungoides, argue against the claim. The autopsy in the severe case pictured in Figs. 219 and 220 showed no visceral involvement. Changes in the deeper organs have been found similar to those that occur in leukemia and pseudoleukemia, but no definite relations have been recognized between these conditions and the disease under consideration. Pardee and Zeit⁷ recorded a case terminating in lym-

¹ Archiv, 1912, cxiv, p. 571.

² Brit. Jour. Derm., 1913, xxv, p. 415 (Histology in a case presented by Pringle before the Royal Society of Medicine, London).

³ Loc. cit.

⁴ Bowen, Jour. Cut. Dis., 1897, xv, p. 65. Breakey, *ibid.*, 1902, xx, p. 316 (Autopsy and histological report; tumor-cells described as lympho-sarcomatous).

⁵ Archiv, 1911, cviii, p. 83 (A careful clinical, hematological, and histological study of six cases).

⁶ Annales, 1912, p. 572—three papers, October, November and December: *Étude des Lymphodermies et des Myélodermies* (Extensive review of cutaneous leukemia and its association with granuloma fungoides).

⁷ Jour. Cut. Dis., 1911, xxix, p. 7.

phatic leukemia. Other examples are recorded of the coexistence of granuloma fungoides and leukemia.¹ The various conceptions of the disease held by divers authorities are summarized by Jarish² in groups, as follows: (1) as a granuloma, by Köbner, Geber, Auspitz, Weisser, Doutrelepont, Ledermann, Hochsinger-Schiff; (2) as an adenoid growth, the expression of a diathesis *lymphadénique*, by Ranvier-Gillot, Demange, Fabre, Gaillard, De Amicis; (3) as sarcoma or lymphosarcoma, by Kaposi, Funk, Siredey; (4) as a disease *sui generis*, midway between adenomatosis and sarcomatosis, by Vidal, Brocq, Leredde, Paltauf; and (5) as a disease *sui generis*, midway between granulomatosis and sarcomatosis, by Walther and Ullmann. Hazen³ regards the disease as a lymphoma.

While the disease, as a rule, attacks the skin alone, the internal organs occasionally become involved. Paltauf and Zumbusch⁴ found in two cases involvement of the mucous membranes, general adenopathy, and nodules in the viscera, and regard the disease as an infectious process.

Diagnosis.—The age, weight, and often the protruberant abdomen, of the patient are usually to be considered. In the early erythematous stages the disease is to be distinguished especially from eczema, psoriasis, urticaria, erythema multiforme, and dermatitis exfoliativa. While a positive diagnosis cannot always be made at this time, in a majority of cases a careful consideration of the typical features just described will leave little doubt as to the nature of the disease. The circinate contour of the lesions, their spontaneous disappearance and reappearance, and the rebelliousness to treatment of what appears to be a mild and superficial inflammatory process, are features not found to the same extent in any of the other dermatoses named above. Aside from the absence of these three marked characteristics, in psoriasis there is much more thickening of the plaques and there are characteristic scales, while the situation, history, and other features of the lesions are usually sufficient for a diagnosis.

In moist forms of eczema, the discharge from and multiformity of the lesions are both greater than in granuloma fungoides. When the early lesions of granuloma fungoides appear in irregular patches, the diagnosis from eczema can be made only after they have been under observation for weeks or months. In those exceptional cases which begin as a generalized exfoliative dermatitis, an early diagnosis is rarely possible. After the appearance of infiltrated plaques, or of well-developed tumors in case the other stages are absent, the diagnosis is usually clear.

The infiltrated areas, nodules, and smaller tumors may at times closely simulate leprosy; but the history, the absence of areas of anesthesia, and other characteristics of leprosy, and the histological examination should clear up the diagnosis without difficulty.

¹ Levisseur, Jour. Cut. Dis., 1911, xxix, p. 556.

² Loc. cit.

³ Hautkrankheiten, Wien, 1908.

⁴ Archiv, 1914, cxviii, p. 679.

The tumors are distinguished from those of sarcoma by their history and career, and by their final formation of characteristic fungoid, superficially ulcerating masses.

Gaucher and Guggenheim¹ attempted to test the specificity of the complement-fixation test in the prefungoid stage of granuloma fungoides. They used as antigen triturated tissue of the disease. In the first case, the test was negative and the patient made a rapid recovery; in the second, the reaction was positive, and the patient died later of bronchial pneumonia. The histology in each case was described as typical for the disease.

Treatment.—Radiotherapy offers the best hope of relief. We employed radiotherapy for five years in an unquestioned case of granuloma fungoides in both the prefungoid and tumor stages with excellent results. Early the plaques disappeared and the patient for months at a time was wholly free from the symptoms of the disease, and later infiltrated areas and tumor-formations were also removed. Each return of symptoms was combated successfully by the same measures for a long period. Eventually, however, the patient succumbed, as is usual. In all of our cases so treated much improvement always occurred, but recurrence was the rule. In some cases the lesions would develop in new areas faster than they could be removed. The relief from itching, healing of foul, discharging ulcers, and removal of fungating masses by this method is gratifying, even though relief be only temporary in most instances. Coley's fluid has been beneficial in certain cases. Gottheil² records such an instance. The itching and complicating dermatoses which may be present in the early stage may be treated in addition locally with various soothing, protecting, and antipruritic applications, according to the indications in each of the cases presented (see treatment of Eczema).

The comfort of the patient is to be secured by all measures, including anodynes in an advanced stage of the disease, and his strength should be supported by a generous diet and tonic regimen. Arsenic in full doses and by hypodermic injection has been of apparent service. Köbner reported one patient cured by this treatment. We have treated three cases with salvarsan. Two improved temporarily after each injection; in the other no appreciable effect was produced. All three cases terminated fatally. Foster,³ Foerster,⁴ Fordyce,⁵ Kingsbury,⁶ and others record similar results.

Locally, ichthyol, bismuth oleate, and many other preparations have been of service in allaying the symptoms and retarding the progress of the disease. When the affection is generalized, tepid baths are productive of great comfort; the use of boric acid, resorcin, thymol iodid, phenol, or some similar agent, is indicated by the fetor arising from the person. The ulcerating masses may be protected by a wet antiseptic dressing, or, after cleansing, dusted with the zinc-stearate

¹ Soc. méd. des Hôp., 1912, p. 151.

² Jour. Cut. Dis., 1909, xxvii, p. 75.

³ Jour. Cut. Dis., 1912, xxx, p. 683.

⁴ Progressive Med., September, 1909, p. 127.

⁵ Personal communication.

⁶ Ibid., 1913, xxxi, p. 417.

PLATE XXVII



Leukemia Cutis. (Fordyce.)

compounds, iodoform, aristol, or other powder, and protected by a proper dressing. Extirpation of the tumors is proper when such a course will add to the comfort of the patient.

Prognosis.—The prognosis is unfavorable, except as to prolongation of life by radiotherapy. The patient may survive from a few months to a maximum of fifteen years, the average being from two to four years. After the development of tumors, the patient may live but a few months or at most two or three years. A few cases of recovery are on record, one of the patients being relieved after an attack of erysipelas.

LEUKEMIA CUTIS.¹

Cutaneous and subcutaneous lesions of various kinds occur occasionally in association with the general disease termed leukemia. They are found both in acute and chronic types of the disorder, as well as in the different varieties, lymphatic and myeloid.

Symptoms.—In acute lymphatic leukemia hemorrhages, both petechial and diffuse, occurring in the skin and mucous membranes are frequently noted, as are also ulcerations and necroses; the latter commonly in the mucous membranes of the mouth and nose, less often in the skin. In chronic lymphatic leukemia lymphomatous nodules and tumors are found in the skin and subcutaneous tissues as well as in the mucous membranes. In myeloid leukemia these manifestations may occur, but are less frequent than in the other variety. The skin in the latter variety is usually dry, lustreless, anemic; and may be the seat of a symptomatic erythema and urticaria, with secondary complications, and occasionally true lymphomatous tumors. Rolleston and Fox² describe nodular infiltrations in an atypical example of the myeloid variety.

In general, the cutaneous manifestation may appear to precede or follow the systemic disease, but at any time they are symptomatic

¹ **LITERATURE:** The following works, with articles referred to in their appended references, were consulted in the preparation of this article, in addition to special papers mentioned below: Nothnagel's *Encyclopedia of Practical Medicine*, American edition, 1905, volume devoted to diseases of the blood, pp. 539-637 (many references); Unna, *Histopathology*, pp. 618-624 (many references); Crocker, 3d ed., pp. 1036-1042; Nicolau: A Contribution to the Clinical and Histological Study of the Cutaneous Manifestations of Leukemia and Pseudoleukemia (*Annales*, 1904, p. 753, abstr. *Brit. Jour. Derm.*, 1905, xvii, pp. 234 and 235); Wende: Leukemic Lesions of the Skin (*Jour. Cut. Dis.*, 1901, xix, p. 479); Shattuck: A Case of Lymphatic Leukemia with Purpura (*Jour. Cut. Dis.*, 1904, xxii, p. 118); Bosellini: A critical study of cutaneous manifestations found in leukemia, pseudoleukemia, and allied processes, with a clinical, hematological, and histological study of granuloma fungoides, and bibliography (*Archiv*, 1911, cviii, p. 83); Nanta: A study of the lymphodermias and the myelodermias (*Annales*, 1912, iii, p. 572—three papers, October, November and December, 1912); idem, *ibid.*, 1914, v, p. 19: Two new cases of lymphodermia (in these articles an extensive study is made of the superficial and deeper lesions which occur in the lymphatic diseases); Fimmen: Lymphatic leukemia with cutaneous tumors (*Zeitschrift*, 1913, xix, No. 8, p. 705); Kreibich: Skin changes in pseudoleukemia and leukosarcomatosis (*Archiv*, 1908, lxxxix, p. 43); Bernhardt: Leukemia of the skin, a study of seven cases (*Archiv*, 1914, p. 17).

² *Brit. Jour. Derm.*, 1909, xxi, p. 377: A Case of Atypical Myeloid Leukemia, with Nodular Infiltration of the Skin (A clinical and histological study, with discussion. Five good cuts, one clinical and four histological).

of a grave disease of the blood. While the general symptom complex is often sufficient to place correctly the varieties of this disease from a clinical standpoint, the final diagnosis rests on the microscopic blood findings, the latter method being imperative in clinically mixed types. It is evident from a study of the literature that certain cases show characteristics that appear to be closely allied to granuloma fungoides¹ and sarcoma cutis; and opinions differ concerning their nosological position, as to whether they represent a single disease or a combination of two of the above disorders.

There are two types of cutaneous lesions: a superficial and a deep variety. Both may occur in the same patient, and a division is made merely for purposes of description. In the first are hemorrhages, petechial and diffuse; papular, vesicular, urticarial, and pigmented lesions; symptomatic erythema; diffuse, scaling erythrodermia; and, in rare instances, a moist or scaling dermatitis accompanied by itching.² Whitehouse³ demonstrated a patient with lymphatic leukemia before the New York Dermatological Society, who had a generalized cutaneous eruption resembling dermatitis herpetiformis. The histology of the lesions showed leukemic infiltration. Among the deeper lesions are ulcers and areas of necrosis, especially of the mucous membranes, but also of the skin, induced by the breaking down of hemorrhagic or lymphomatous deposits. Nodules and tumors of various sizes, shapes, and colorations also occur. All these lesions may develop on different parts of the body, but show a predilection for the extremities and face.

The nodules vary in size up to that of a coffee bean, may be few or numerous, and occur especially on the extremities and face. They may be pale and waxy, reddish, brownish-red, or yellowish-red in color, firm or soft in consistency, movable with the skin, smooth or scale covered, oval, round or flat, or even have depressed centres, and may be often accompanied by telangiectatic vessels. When abundant on the face, especially in association with larger growths, a leonine expression may be exhibited.

The tumors vary in size up to that of a hen's egg or larger, and, like the nodules, may be few or numerous. They grow slowly but continuously, as a rule, and only exceptionally break down. Winfield⁴ described multiple lymphoid tumors of the skin not associated with leukemia, and cites a similar recorded case in which at a later date leukemia developed.

Arndt⁵ says the old names, lymphatic and myeloid leukemia, should be replaced by aleukemic, subleukemic, and leukemic lymphadenosis and myelosis. In the aleukemic form the blood is normal. In the subleukemic form the blood shows a relatively normal leukocytic count.

¹ Pardee and Zeit, *Jour. Cut. Dis.*, 1911, xxix, p. 7; Levisseur, *ibid.*, p. 556; and others.

² Hazen, *ibid.*, p. 521 (A report of three cases and extensive bibliography. One case presented marked hyperpigmentation, another vesicular lesions).

³ *Ibid.*, 1912, xxx, p. 683.

⁴ *Ibid.*, 1913, xxxi, p. 246.

⁵ *Trans. Amer. Med. Assoc., Sec. on Derm.*, 1914, p. 103.

but the proportion of lymphocytes is increased; while in the leukemic form the blood shows an increased number of leukocytes, with progressive increase of lymphocytes.

Under the title of *lymphadenids* (*leucemide*, Audry) are classed the cutaneous eruptions occurring with the disorder that are not characteristic in themselves, either clinically or histologically, and which occur in other diseases. These lesions may be purpuric (frequently terminating in necrosis), prurigo-like papules or papulovesicles; or the skin may present only the features of a traumatic dermatitis, due to scratching induced by severe itching; and, finally, universal exfoliative erythrodermia.

The lymphadenosis proper of the skin Arndt subdivides into two varieties: the universal and the circumscribed. The former is represented by a universal infiltrating erythrodermia, with characteristic hematological and histological lymphadenotic features. The circumscribed variety is characterized by circumscribed patches and tumors, and may be observed in aleukemic, subleukemic, and leukemic lymphadenosis. The site of predilection of these lesions is the face, though in exceptional cases they may be generally distributed.

In a small proportion of cases of acute lymphatic leukemia green tumors (chloromata) occur. Children more frequently suffer, and the tumors are usually seen on the face, temples, and cranium. The osseous system is especially affected, the bone-marrow often being replaced by a peculiar greenish mass. The lymphogenous green tumors are deposited in the facial and cranial bones, in or under the periosteum or dura. In addition, practically every bone of the body has been described as the seat of these peculiar green tumors.

Etiology and Pathology.—The cutaneous manifestations above described are a part of the general leukemic process which involves all portions of the human organism. The essential cause is unknown. The leukemic nodules and tumors are situated anatomically in the corium and upper part of the subcutaneous tissue and are made up of accumulations of lymphocytes. The infiltration of these cells is not limited to the nodules and tumors, but occurs throughout the skin, even where no clinical evidence of its presence exists. The process begins as a perivascular lymphocytic infiltration, especially about the coil-glands, and spreads upward toward the epidermis and downward into the subcutaneous tissue. The morbid growth is usually separated from the epidermis by a thin layer of normal corium. While the infiltration may be dense, it spreads around normal structures without destroying them. The lymph-vessels in the region are full of lymphocytes, which may mean that these cutaneous lymphomata produce some of the specific cells found in the general circulation. In the cases resembling granuloma fungoides a multicellular infiltration similar to that found in this disease is described. Bruusgaard¹ records two cases with metastatic cutaneous tumors. The histological study revealed

¹ Archiv, 1911, cvi, p. 105; abstr. Jour. Cut. Dis., 1912, xxx, p. 113.

lymphocytes, plasma-cells, eosinophiles, and fibroblasts. This picture he interprets as an example of malignant granuloma.

Treatment.—The treatment is that of the general affection under consideration. Radiotherapy is advised as a temporary alleviative measure. Stengle and Pancoast¹ advise radiotherapy in chronic leukemia over the long bones, and in pseudoleukemia over the glandular enlargements, but say it is contraindicated in acute leukemia. Billings² used benzene in connection with radiotherapy with good results. He advises its use with caution and says care must be exercised to procure a pure preparation of the drug. Lawson and Thomas³ report improvement in a case similarly treated.

Lymphoderma Perniciosa (Kaposi) (Fr., *Érythrodermie Mycosique*).—A group of cases is described in which the true leukemic process occurs later, the early manifestations being exhibited as a moist, itching dermatitis, with redness and swelling of the skin, and in which finally nodules and tumors form, with a tendency to break down. These cases resemble in a high degree granuloma fungoides; and Kaposi's case is classed as such by Vidal, Hallopeau, Paltauf, Crocker, and others.

PSEUDOLEUKEMIA CUTIS.

Synonym.—Lymphadenoma.

The cutaneous manifestations occurring in this disorder correspond closely with those described in connection with lymphatic leukemia, though pruriginous papules and urticaria are more frequently found. Bowen⁴ found close resemblance between the nodules occurring in two cases of pseudoleukemia cutis and the papules of true prurigo. In the major portion of cases either prurigo-like papules, associated with intense itching and pigmentation, or lymphoid nodules are exhibited. The lymphatic cutaneous tumors are similar to those seen in leukemia. Finally, pseudoleukemia may follow a general erythrodermia, as occasionally happens in lymphatic leukemia. Recent investigations appear to prove the disorder to be of infectious origin.⁵ A Gram-staining, non-acid-fast, polymorphous, diphtheroid bacillus has been isolated from patients suffering with the disorder, and a vaccine made from it by Billings and Rosenow has been used successfully in the treatment of the disease.

Bunting and Yates⁶ conclude from a more extended study of the above mentioned organism through animal experimentation that there exists an etiological relationship between this diphtheroid organism (*Bacterium Hodgkini*) and Hodgkin's disease (pseudoleukemia).

¹ Jour. Amer. Med. Assoc., September 28, 1912, lix, p. 1166.

² Ibid., February 15, 1913, lx, p. 495 (with bibliography of benzene therapy).

³ Ibid., December 13, 1913, lxi, p. 2157.

⁴ Jour. Cut. Dis., 1897, xv, p. 72.

⁵ Bunting and Yates, Arch. of Internal Med., August, 1913, p. 236; and Jour. Amer. Med. Assoc., November 15, 1913, p. 1803. Negri and Micremet, Centralb. f. Bakteriöl., 1913, lxxvii, p. 292. Fränkel and Much, Zeitschr. f. Hygiene, 1910, lxxvii, p. 159. Billings and Rosenow, Jour. Amer. Med. Assoc., 1913, lxi, pp. 21 and 22 (Cf. report for special technique for growing the organism).

⁶ Jour. Amer. Med. Assoc., 1914, lxii, p. 516.

SARCOMA CUTIS.

Definition.—Sarcoma of the skin is a rare disorder characterized by the occurrence, either as primary or as secondary developments, of a single or multiple, pea- to egg-sized and larger, pigmented and non-pigmented, cutaneous and subcutaneous, connective-tissue neoplasms, having a marked inaptitude for ulceration, malignant in character, recurring after extirpation, and usually terminating fatally with involvement of the viscera.

The term *sarcoma*, meaning a fleshy tumor, was employed originally by Virchow to designate malignant connective-tissue tumors; it included actinomycosis and other affections which are now known to belong to the *granulomata*. A satisfactory grouping of the *sarcomata* is not possible. The three types suggested by de Amicis¹ are the following: (1) cutaneous sarcoma devoid of pigment and occurring at one spot or in multiple foci; (2) cutaneous melanotic sarcoma; (3) cutaneous multiple pigmented or hemorrhagic sarcoma.

Non-Pigmented Sarcoma Cutis.—Non-pigmented sarcoma may occur as a single localized tumor, or there may be a few or a large number of such lesions. The localized single tumor may develop on or beneath the normal skin, may follow an injury, or may arise in the site of a nevus, wart, scar, or other cutaneous lesion. It may occur as a cutaneous or subcutaneous nodule or tumor, varying in size up to that of an orange, and be of the color of the normal skin or darker in hue. It may be mushroom-like, pedunculated, or occur as a profuse infiltration. In consistency these lesions are less hard than the *carcinomata*, and at times are soft and pulsatile from admixture of vascular tissue. Finally, they may ulcerate and become generalized, the secondary lesions attacking other parts of the skin, subcutaneous tissue, lymphatic glands, and the viscera.

The above described localized lesion is the most benign of the *sarcomata*.

Fibro-sarcoma may occur as a single lesion,² or multiple tumors³ may develop in the course of years. It is characterized by its slow growth and lack of malignancy.

Generalized Non-Pigmented Sarcomata⁴ present tumors of varying size, coloration, and number. They may be few in number or amount to hundreds. They are firm, elastic, freely movable under the skin or adherent to it, and may be of the color of the normal skin, or of a dark-blue tint, at times accompanied by telangiectasia. They vary in size from that of a small shot to that of a walnut or even a hen's egg, and only exceptionally ulcerate. They occur as the result

¹ Trans. XII Internat. Cong. of Med., Moscow, 1897; abstr. Brit. Jour. Derm., 1897, ix, p. 440.

² Johnston, Jour. Cut. Dis., 1903, xxi, p. 23.

³ Ionides, Brit. Jour. Derm., 1896, viii, p. 439.

⁴ Koehler and Johnston, Jour. Cut. Dis., 1902, xx, p. 5: Idiopathic multiple sarcoma of the skin; an extensive generalized case (small spindle-cell sarcoma).

of a dissemination of the sarcomatous cells through the blood, and as a rule terminate fatally in from six months to two years after generalization. Multiple sarcomata may in rare instances be congenital. Such a case is described by Crocker.¹

General sarcomatosis at times closely resembles granuloma fungoides, many examples being on record where neither a clinical nor histological study showed a distinction.² The tumors occurring in association with leukemia and pseudoleukemia also closely resemble those of this group, such tumors being described as general sarcomatosis with leukemia. (For discussion and references, see Granuloma Fungoides.)

Recurrent Fibroid of the Skin (Hutchinson), beginning usually in the lower extremities, and tending to slow extension, to rapid and persistent recurrence, and to ulceration and formation of fungous tumors, with ultimate marasmus, is set down by Crocker³ as a rare form of spindle-cell sarcoma.

Etiology and Pathology.—The tumors in this group occur at an earlier age than do the other sarcomata and the carcinomata. They are not infrequently congenital, and the female sex is less often attacked than the male. The cause of the disorder is unknown.

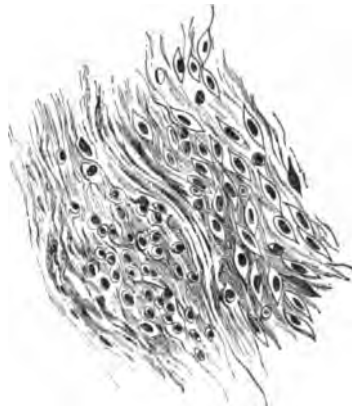
The tumors are composed of round, or mixed spindle and round cells, presenting at times a picture very much like leukemic nodules. The small round cell is only rarely found composing the larger part of the tumor. It not infrequently occurs in varying numbers in association with other types. The large

round cell is the most common. Spindle-cells occur as both large and small types, and are fusiform or oat-shaped. Giant-cells rarely occur in the skin, and when found are, as a rule, the result of metastases from the bone.⁴ The degree of malignancy is determined somewhat by the character of the cellular composition, the fibrosarcomata being the least malignant, the small round-celled the most malignant, and the spindle-celled being intermediate.

Diagnosis.—The disorders to be differentiated are leukemia and pseudoleukemia cutis, granuloma fungoides, fibromata, and lepra.

Prognosis and Treatment.—The prognosis in fibrosarcoma is the least grave. Recovery after surgical extirpation usually occurs. In

FIG. 225



Sarcoma. Spindle-cells visible in sections of cutaneous nodule removed from a sarcomatous patient. (About $\times 300$.)

¹ Page 1025.

² Bowen, Jour. Cut. Dis., 1897, xv, p. 65.

³ Page 1023.

⁴ Perrin and Leredde (Annales, November, 1895; abstr. Brit. Jour. Derm., 1896, viii, p. 147 (Generalized idiopathic cutaneous sarcoma with giant-cells. This case did not appear to be metastatic).

the single tumors of other varieties described above recovery may occur after surgical removal. Such treatment cannot be practised in generalized cases. In some varieties of these the patient may live for many years; in others a rapidly fatal result occurs.

Arsenic, as originally suggested by Köbner and Sherwell,¹ is occasionally of value. Mixed toxins of erysipelas and bacillus prodigiosus (Coley's fluid) have been of some service. X-rays will remove individual lesions, but the treatment cannot be said to be curative.

FIG. 226



Melanotic sarcoma. (Fordyce.)

Melanotic Sarcoma (*Nevocarcinoma*, *Nevomelanoma*, *Melanoma*).—The disorder described under the above titles is the most malignant and rapidly fatal of the cutaneous sarcomata.

Symptoms.—The chief clinical characteristics of the affection are its frequent development from the mole or pigmented spot; the

¹ Amer. Jour. Med. Sci., October, 1892.

production of pigment; the marked regional and general metastases; and its malignancy. As a rule, the first lesion noted is a pigmented spot or a mole undergoing some change. In some cases, however, no such preliminary lesion is noted. When beginning in a mole, the latter increases in size; assumes a darker color; not infrequently ulcerates, the ulceration occasionally healing to a degree; or it may become surrounded by an area of deep pigmentation. These changes may occur independently or result from the irritation induced by trauma or caustics. When occurring in a black spot (*Hutchinson's malignant lentigo*), such as frequently develops on the foot, the lesion becomes elevated, and in the neighborhood new lesions, which may be macules, papules, or tubercles, all of a black color, develop. Not infrequently these occur subsequent to the operative removal of the primary lesion. The epidermis may be thinned but intact,

FIG. 227



Melanotic sarcoma.

fissured and hemorrhagic, or ulcerated. The floor of the ulcer is black or brownish-black in color, and appears as though filled with ink, secreting a black, hemorrhagic fluid. As a rule, metastatic growths appear early.

The lesion or lesions may remain stationary for a long time, or they may be followed rapidly (which is the rule) by generalization, as the result of local irritation or otherwise, producing lesions in the neighborhood; when near, by way of the lymphatics, and at a distance by way of the blood. Hartzell¹ recorded a case of two years' duration, apparently benign, showing the typical structure of pigmented sarcoma.

The disseminated cutaneous lesions are bean- to egg-sized, firm or doughy in consistency, spherical, lobulated, sessile or pedunculated, and vary in color from grayish-brown to inky-black. The lesions, as a rule, begin in the skin of the face and extremities, particularly about the foot. A common site, also, is in one of the pigmented structures of the eye. The lymphatic glands adjacent to the primary growth usually enlarge at an early date, and on microscopic examination show pigment- and tumor-cells similar to those of the original growth. In case they break down and ulcerate, they exhibit ulcers similar to those described above. The pigment present varies greatly in amount in different cases and in different tumors of a given case. The tumors may be of the normal color of the skin, or light-brown,

¹ Jour. Cut. Dis., 1893, xi, p. 13.

brown, and even jet-black. In extreme cases streaks of black pigment may be seen extending from the primary lesion to the nearest lymphatic glands, or extensive areas of pigmentation may occur in the skin at some distant point. In others, by extension through the blood and involvement of the vascular walls, a general bronzing may occur. Pigment is usually present to a marked degree in the lymphatic glands and metastatic tumors. This may even follow what appears to be a non-pigmented primary lesion. In certain cases the pigment may be sufficient to cause melanemia and melanuria.

The course of the disorder varies, though it is usual for it to be rapidly malignant. A small, insignificant primary lesion may be followed within a short time by general visceral metastatic involvement, which proves rapidly fatal. It is possible that cases of this type, in which the primary lesion has passed comparatively unnoticed, are those in which the disease is supposed to have originated in lymphatic glands.¹ In the *melanotic whitlow of Hutchinson*² there occurs a chronic onychia, with the nail-fold swollen. Early there occur pigmented spots or streaks, suggesting silver-nitrate stains, at the edge of the nail-fold. In a short time ulceration occurs and a fungous tumor develops. Hyperpigmentation supervenes, the nail is exfoliated, and the process becomes generalized.

Pathology.—The pathogenesis of this growth is not clear. Early opinion placed the sarcomata as arising from some part of the connective tissue of the corium, the melanotic variety being distinguished by cells showing hyperpigmentation. Von Recklinghausen believed they originated in the endothelium of lymphatic vessels. Ribbert³ believed the chromaphores, which were thought to be connective-tissue cells, the point of origin. Johnston⁴ concludes that the commonest, and therefore the most important, melanomata are derived from soft nevi, which are endotheliomata of lymph-vessel origin. Unna,⁵ Gilchrist,⁶ Schalek,⁷ Whitfield,⁸ and others⁹ believe the growths are of epithelial origin, and to these growths the title nevocarcinoma is applied. Fox, W. S.,¹⁰ concludes that the major portion of nevomelanoma are nevocarcinoma. Fordyce¹¹ believes there may be a twofold origin for nevi, and would class the pigmented malignant growths for the present as melanomata.

¹ Eve, Practitioner, 1903, p. 165.

² Arch. of Surg., iii, p. 519.

³ Geschwulstlehre, p. 225: quoted by Fordyce, Jour. Amer. Med. Assoc., 1910, liv, p. 91.

⁴ Jour. Cut. Dis., 1905, xxiii, pp. 1 and 49 (Melanoma: an extensive study of pigmented tumors, with bibliography).

⁵ Berlin klin. Wochenschr., 1903, xxx, p. 14.

⁶ Jour. Cut. Dis., 1899, xvii, p. 117 (investigation of two cases and of several pigmented moles; bibliography).

⁷ Ibid., 1900, xviii, p. 145 (histological study of five cases, with review of literature).

⁸ Brit. Jour. Derm., 1900, xii, p. 267 (two cases, with references).

⁹ Whitehead, Johns Hopkins Hosp. Bull., 1900, xi, p. 221 (two cases, with review of literature).

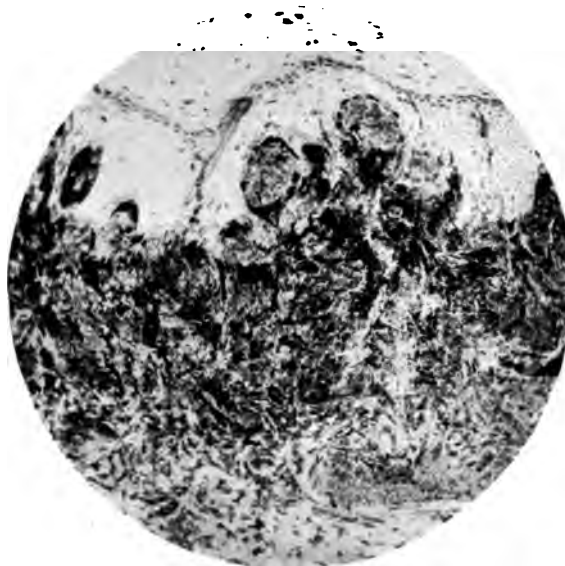
¹⁰ Brit. Jour. Derm., 1906, xviii, pp. 1, 47 and 83.

¹¹ Jour. Amer. Med. Assoc., 1910, liv, p. 91 (Melanoma and some types of sarcoma of the skin).

The histology varies in different cases and in different parts of the same tumor; there being in some an alveolar arrangement of large or small cells in one part, and bundles of spindle or branched and stellated cells in another. The spindle-cells occur most frequently. The pigment, which is melanin, also varies. In some cases the component parts of the cell can hardly be distinguished owing to the dense pigmentation. In other cells no pigment whatever can be discovered.

Diagnosis, Prognosis, and Treatment.—The recognition of melanotic sarcoma is usually not difficult. An irritated and growing pigmented nevus should at once be suspected as the beginning of a series of grave

FIG. 228



Melanoma of the foot. Zeiss 16 mm., C. O. 4. Showing the tumor situated directly beneath the epidermis and its extensive pigmentation. Clumps of chromatophores and pigment are also seen in the epidermis. (Fordyce.)

events. Occasionally, this is insignificant and the disease has advanced beyond control before its nature is suspected. Early and complete removal may prevent dissemination, but frequently immediate generalization follows the removal of the local lesion; or recurrence may be delayed for several months.

Arsenic has no influence on the progress of the disease, and other measures are usually equally inefficient.

Idiopathic Multiple Hemorrhagic Sarcoma (*Idiopathic Multiple Pigment-Sarcoma* (*Kaposi*)).—This disease was originally described by Kaposi, in 1879, under the second of the above titles. It is rare, but a number of cases have been recorded, both in this country and abroad. It occurs, as a rule, in men, and most frequently on the

PLATE XXVIII



Multiple Pigmented Idiopathic Sarcoma.

lower extremities, beginning on the feet or ankles. Later the legs, arms, trunk, and face may become involved. The early lesions are

FIG. 229



Idiopathic multiple hemorrhagic sarcoma. (Lieberthal.)

reddish-brown, bluish-red, or dark-purplish, firm nodules, pinhead- to pea-sized or somewhat larger, discrete or grouped, forming infiltrations

FIG. 230



Idiopathic multiple hemorrhagic sarcoma. (Fordyce and Stewart.)

of varying size. As the lesions multiply and infiltration progressively involves the limb, often producing an elephantiasic condition, the foot,

hand, or entire limb becomes hard, bluish in tint, and covered with a smooth, mammillated, squamous or rugous epidermis, which may also be the seat of nodules of various sizes. At times the nodules are covered with or surrounded by telangiectases or by tissue exhibiting infiltration of blood.

The growths may remain stationary for a long time, or they may undergo resolution, the patient apparently making complete recovery.

Etiology.—The disorder occurs usually in males past the fortieth year. In a *résumé* of the recorded cases, Sequeira found only five cases recorded in females, and all of these were not undoubted instances. He found three whose development followed severe chill, but believes gout and rheumatism, sometimes given as etiological factors, are incidental. Lieberthal observed trauma in two of his four cases, and Jackson's¹ case followed a frost-bite.

FIG. 231



Idiopathic multiple hemorrhagic sarcoma. (Fordyce and Stewart.)

Pathology.—Histologically, Kaposi found a round-cell sarcoma. In some instances features characteristic of spindle-cell sarcoma were seen. Capillary hemorrhages were noted, which explained the peculiar discoloration and pigmentary changes.

The histopathology has more recently been studied by Wende,² Bulloch,³ MacLeod,⁴ Lieberthal,⁵ Sequeira and Turnbull,⁶ and Favara.⁷ The histological changes occur in the corium, the epidermis showing secondary involvement. The latter is thinned and has the inter-papillary processes flattened out over the tumor, but shows pro-

¹ Brit. Med. Jour., October 2, 1897, p. 866 (quoted by Sequeira).

² Jour. Cut. Dis., 1898, xvi, p. 205.

³ Brit. Jour. Derm., 1901, xiii, p. 204 (case report by Sequeira, with histology by Bulloch, with bibliography).

⁴ Ibid., 1905, xvii, p. 173.

⁵ Brit. Jour. Derm., 1913, xxv, p. 351.

⁶ Jour. Cut. Dis., 1909, xxvii, p. 522.

⁷ Archiv. Bd. cix, p. 387; abstr. Brit. Jour. Derm., 1912, xxiv, p. 82 (a clinical and histological study, based on six cases).

liferation of the rete at the edges of the growth. In certain cases, where marked thickening has occurred, more extensive changes are described.

The condition has been considered a sarcoma by Kaposi and others, a chronic inflammatory process (Bulloch, Turnbull), and a granuloma. It has also been described as a growth of organizing connective tissue associated with marked vascular dilatation, edema, and deposit of blood-pigment (MacLeod). The middle and upper parts of the corium are involved, showing a markedly vascular structure, with increased capillary loops, the latter being dilated and showing endothelial proliferation. Occasionally, the dilatation is sufficient to produce small sinuses. The lymphatics and lymph-spaces contain pigment- and

FIG. 232



Idiopathic multiple hemorrhagic sarcoma. Zeiss 8 mm., C. O. 4. Showing the new-formed vessels and blood-spaces in the sarcoma tissue. (Fordyce.)

red-blood cells. Edema is found throughout the area, and the elastic tissue has disappeared from the centre of the mass (MacLeod). The cells are of the connective-tissue type, both spindle and round. Mast-cells are occasionally described in small numbers.

The chief changes are summed up by Favera as follows: new-formation and dilatation of the blood-capillaries and lymph-vessels; infiltration with spindle-cells, either related to the capillary new-formation or of endothelial origin; and a small-cell and plasma-cell infiltration.

The pigment in these cases gives the iron reaction, and is derived from the hemorrhages occurring from the engorged capillaries. It differs from that found in melanotic sarcoma, where it is a product of cellular activity.

Treatment.—Arsenic was used with success by Köbner,¹ Wende,² Da Costa,³ and others. X-rays produced total involution of the lesions in a case recorded by Heimann,⁴ and improvement in one recorded by Lustgarten.⁵

Prognosis.—The major portion of cases prove fatal in from two to five years. Spontaneous recovery has been reported, and more recently recovery following treatment has been noted. In several cases the disease has lasted for many years. Cases of this sort have been recorded by Hardaway,⁶ Brayton,⁷ and others.⁸

ORIENTAL SORE.⁹

Synonyms.—Mycosis Cutis Chronica, Lupus Endemicus, Aleppo Evil, Biskra Bouton, Delhi Boil, Oriental Button, Oriental Ulcer, Gafsa Button, Afghan Plague, Taschkat Ulcer, Natal Sore. Fr., Bouton d'Orient, Chancre du Sahara, Clou de Biskra; Ger., Endemische Beulenkrankheit.

The morbid condition known as oriental sore is one designated not merely by the synonyms detailed above, but by a series of names in the Arabic, Turkish, Persian, and Russian languages which refer to the same disease. It is an endemic cutaneous affection, recognized chiefly in tropical and subtropical countries, more particularly in those sections which have given titles to the disease, such as Biskra, Gafsa, Aleppo, Bagdad, and Delhi. It occurs in Morocco, Algiers, Tunis, Egypt, Crete, Cyprus, the Crimea, Syria, Mesopotamia, Arabia, Persia, Turkestan, India, in Brazil, and probably other portions of South America. Occasionally, from these centres infected patients are transported to various other countries, including England and America.

Definition.—Oriental sore is a specific ulcerative process occurring on exposed portions of the body, running a fairly definite course, and terminating in cicatrization. It is produced by the *Leishmania tropica* (Wright).

¹ Berlin klin. Wochenschr., No. 2, 1883.

² Loc. cit.

³ Festschrft. (Unna), 1910, xx, No. 1, p. 212; abstr. Jour. Cut. Dis., 1911, xxix, p. 652.

⁴ Jour. Cut. Dis., 1913, xxxi, p. 424.

⁵ Ibid., 1905, xxiii, p. 171.

⁶ Ibid., 1890, viii, p. 21.

⁷ Indiana Med. Jour., November, 1893 (quoted by Fordyce).

⁸ Sequeira, Brit. Jour. Derm., 1901, xiii, p. 201.

⁹ Firth, Vierteljahr., 1886, p. 805 (Zur Anatomie und Ätiologie der Orientbeule). Cunningham, Scientific Memoirs by the Medical Officers of the Army of India, No. 1, 1884, Calcutta, 1885 (On the presence of peculiar parasitic organisms in the tissue of a specimen of Delhi boil). Wright, Jour. Cut. Dis., 1904, xxii, p. 1 (Protozoa in a case of tropical ulcer). Scheube, Diseases of Warm Countries, 2d ed., 1903, p. 53. Darling, Jour. Cut. Dis., 1911, xxix, p. 617 (a clear exposition of the subject, including an historical sketch, geographical distribution, climatological factors, and clinical, pathological, and bacteriological description). Hutton, Jour. of Tropical Med. and Hygiene, 1912, xv, No. 1, p. 9; abstr. Jour. Cut. Dis., 1912, xxx, p. 376. Wenyon, Parasitology, iv, 1911; abstr. Brit. Jour. Derm., 1912, xxiv, p. 166 (Oriental sore in Bagdad). Manson, Manual of Tropical Medicine, p. 599. Howard Fox, Jour. Cut. Dis., 1912, xxx, p. 206 (four illustrations of oriental boil, furnished him by Dr. Adams, of the Assyrian Protestant College at Beirut). Hodara and Bey, Derm. Wochenschr., 1912, xlv, No. 1, p. 16; abstr. Jour. Cut. Dis., 1912, xxx, p. 229. Castellani and Chalmers, Manual of Tropical Medicine, 2d ed., 1913, p. 1548. McEwen, Jour. Cut. Dis., 1914, xxxii, p. 275 (Oriental sore in the Americas, with report of case).

Symptoms.—The disease begins, after an incubation period of days or months, as a circumscribed, itching maculo-papule, often appearing like an insect-bite, and having a firm, shot-like feel. It is situated on a hyperemic and infiltrated base. In the course of a few days, its surface becomes covered with furfuraceous scales, which later become agglutinated by the secretion from beneath of a thin fluid, forming a yellowish-brown, thick, adherent crust. On the removal of this crust there is exposed beneath a shallow ulcer, which extends peripherally and exudes a secretion, which tends to reproduce the crust. Beneath this crust the ulcer gradually spreads. In the vicinity, satellites composed of new papules and ulcers form. These often merge and produce a single sharply outlined, rounded or oval, punched-out ulcer, with a granulating floor, edematous base, outlying areola, and bulky crust. The dimensions of the ulcer vary from 6 to 12 or more centimeters in diameter.

After a period of from two to twelve or more months, repair takes place by the gradual drying of the lesion and the usual processes of granulation and cicatrization. The resulting scar is usually sunken, at first pigmented, and, about the face, is apt to be exceedingly deforming. The areas chiefly affected are the exposed portions of the body, such as the face, ears, hands, feet, arms, and legs. As a rule, the palms and soles, the scalp and trunk are not invaded. In some cases the primary lesion does not proceed to ulceration, but remains in the nodular stage, from which it undergoes involution. Instead of one, there may be several, in rare instances a large number, of separate sores. By some writers a verrucous type has been described, and by others mucous-membrane involvement has been recorded. In some instances an irregular fever has been noted occurring for some time before the development of the lesion. The course of the disorder is gradual extension for several months until a certain stage is reached, then gradual involution of the lesion, ending in scar-formation; the whole process requiring in the major portion of cases an average of from three to five to twelve or fifteen months.

Etiology.—Oriental sore is contagious, autoinoculable, transmissible by direct contact, and apparently also through the medium of insects and articles of clothing. It affects indiscriminately persons of both sexes and of all ages and nationalities, independently of the general health or occupation. It often attacks children in the second year of life, and seems at times to confer a species of immunity against second attacks, though many instances tend to disprove the possibility of such protection. Those exposed may develop symptoms in the course of two weeks, though in other instances it would seem that many months intervene before the infection is established. Nicolle determined experimentally that the incubation period varied from 16 to 166 days. Hutton recorded the case of a lieutenant in the British army, who contracted the disease in India, in whom the incubation period appeared to be eleven months. The direct cause of the disease is the parasite *Leishmania tropica*.

Pathology.—The organism accepted as the cause of the disorder was described in 1904 by Wright, who discovered in a smear preparation made from a tropical ulcer intracellular organisms, to which he gave the name *Helcosoma tropicum*. Previous to this time, Cunningham, whose observations were confirmed by Firth, described an organism termed by them *Sporozoa furunculosa*. It appears that most observers believe this organism differs from the one described by Wright. The latter organism may be seen in smears from ulcers or in films taken from serum expressed from nodules, and occurs as a small, oval, round or oblong body, situated in the cytoplasm of large mononuclear cells. It has a large, purple-staining mass placed at the periphery, and a smaller, more deeply staining rod or dot placed at a short distance from the trophonucleus and at different angles with respect to it and the long axis of the parasite (Darling). The organism varies from 2 to 4 microns in diameter, and the method of reproduction is by fission. Darling states that the pathogenic agent of oriental sore is morphologically indistinguishable from the bodies found by Leishman and Donovan in the spleen of patients dying from kala-azar.

The histology as described by various observers shows an extensive cellular infiltration occurring throughout the corium and in the papillæ, accompanied by atrophy and disappearance of the epidermis. The cellular infiltrate is composed of plasma-cells, lymphoid-cells, and, according to Wright, large cells with single vesicular nuclei and a relatively large amount of cytoplasm, in which are large numbers of microorganisms. In the latter, which composes a large part of the infiltration, the microorganisms are closely packed together and occupy most of the space between the nucleus and the cell-membranes, twenty or more microorganisms being found in one cell. In addition, giant-cells in varying numbers are described. The sweat-glands and perivascular lymph-spaces show considerable round-cell infiltration; and coincident with the ulceration there is a secondary invasion of ordinary cocci, with accompanying leukocytic infiltration (Darling).

Diagnosis.—The diagnosis in localities where the affection is endemic is attended with but little difficulty; but among the classes in which the disease is especially likely to be encountered it is confused most often with syphilis. The strictly local character of the oriental sore, the course of the lesion, the duration of the disease, and, finally, the demonstration of the causative organism, make the distinction.

Treatment.—Treatment is unsatisfactory. Cauterization, excision, erosion, and local antiseptic treatment are the methods usually employed in the management of the disorder. By many local authorities the milder and soothing, rather than the more severe and drastic, measures are advocated. According to Castellani, salvarsan, atoxyl, and radiotherapy have not been successful. Jeanselme¹ reported improvement with salvarsan. Castellani recommends disinfection of

¹ Bull. Soc. fran Derm., January, 1914, p. 4.

the lesion with a 1 to 1000 bichlorid solution, followed by an antiseptic ointment containing iodoform, eucrophen, or boric acid.

Prognosis.—The prognosis is generally favorable save in the matter of the deformity left by the resulting scars, which may by contraction result in considerable disfigurement of the face.

FRAMBESIA.¹

Synonyms.—Yaws, Pian, Polypapilloma Tropicum, Bouba or Boba, Bouton d'Amboine, Tonga, Parangi.

Definition.—Frambesia is an infectious and contagious disorder, existing endemically in certain tropical countries, affecting chiefly the colored races, characterized by peculiar raspberry or cauliflower-like lesions, and produced by the *Spirocheta pertenuis*. The term frambesia was applied to the disorder by Sauvages, in 1759, but the disease has since been recognized under many colloquial terms, only a few of which are mentioned above. From an historical standpoint the disorder appears to have been recognized for a long period of time. It occurs in Northern Africa, Algeria, Mozambique, Madagascar, and the Comoro Islands, in Asia, Australasia, and the French and English West India Islands. Imported cases occasionally are recorded in England and America.²

Symptoms.—The disorder is recognized by all authors as occurring in two stages; a number believe there is in addition a tertiary group of symptoms. These later symptoms are ascribed by some to an intercurrent infection with syphilis. According to Castellani, whose description is for the most part followed in these paragraphs, three stages occur. An incubation period, varying from two to four weeks, characterized by mild constitutional symptoms, including elevation of temperature, headache, malaise, and rheumatoid pains, is followed by the development of the primary lesion at the site of the inoculation, which is always extragenital. The primary lesion is a moist, crusted papule, which soon becomes surrounded by several others of similar type, and by fusion a single lesion is formed, which is covered by a thick crust. This later develops into an ulcer having a granulating floor and clean-cut edges. The subsequent career of this lesion varies. Occasionally, it heals, leaving a whitish scar, which later becomes pigmented; or it may develop into a lesion typical of the so-called secondary stage. The primary lesion (*maman pian*, "mother yaw") may be painful or present itching sensations, is not indurated, and is found most frequently on exposed surfaces—in men and children on the hands, arms, and legs; in women on the breasts, hips, and other areas. In from one to three months after the beginning of this

¹ Castellani, Brit. Med. Jour., November 23, 1907, p. 154 (with cut showing spirochete), and Jour. Cut. Dis., 1908, xxvi, pp. 151-210; Castellani and Chalmers, Manual of Tropical Medicine, 2d ed., 1913, p. 1170; Scheube, Diseases of Warm Countries, 2d ed., p. 290; Manson, Tropical Diseases, 4th ed., 1910, p. 566.

² C. J. White, Jour. Cut. Dis., 1910, xxviii, p. 533; and White and Tyzzer, *ibid.*, 1911, xxix, p. 138.

lesion, the secondary manifestations occur. Their development is also preceded by constitutional symptoms. The lesions begin as small, reddish papules, irregularly disseminated, some of which show a yellow point or small, yellow apical crust. These remain for some weeks, when part of them disappear, leaving furfuraceous patches. Others become larger and develop into the characteristic nodules of the disease. These lesions vary in size from that of a large pea to a nut, and present a granulating surface, likened to a raspberry or cauliflower, secreting a thin, purulent material, which on drying produces a yellowish or brownish crust. This type of lesion occurs commonly on the upper and lower limbs and face. By coalescence rings may be formed about the mouth, anal region, and other areas ("ringworm jaws"). After some weeks the surface of the lesion becomes verrucous. This latter type of lesion occurs particularly on the dorsum of the foot and toes. On the palms and soles livid or dark brownish spots first appear; later typical frambesial nodules develop. In another type, hard, round, flattened papules, or small nodules having a thick, hard, epidermic plug in the centre, are observed on the palms and wrists. Upon exfoliation of the plug, a deep, permanent depression remains.

The subjective sensations vary. There may be itching, and in certain situations, such as on the soles of the feet, pain is exhibited. A peculiarly offensive odor is often exhaled from these patients. The course of the disease varies. In the majority of cases—in children in from three to six months, and in adults in from six to twelve months—the lesions undergo resolution, leaving dark, hyperpigmented spots. In some cases they continue to develop in crops of nodules for several years, the individual lesion running its course in from two to four months. Occasionally, a much longer time is required for their evolution.

In addition to the above described typical lesion, scaling, papular, and ulcerative lesions occur. During the latter part of the secondary stage there may also be roundish or irregularly outlined, whitish patches, covered with hard, conical papules. A composite of an average case shows typical frambesial tubercles, reddish papules with intact epidermis, other papules moist and crust covered, furfuraceous patches interspersed, and hyperpigmented areas developed from previous lesions. In the tertiary stage gummatous-like nodules and deep ulcerative processes are described. In career the former are indolent, and after softening and breaking down produce ulcers with clean-cut margins and papillomatous bases, which by coalescence produce a serpiginous configuration. At other times, irregularly shaped ulcerations, with thick, undermined edges, occur, as well as large, fungating ulcers. Upon the disappearance of the ulcers more or less disfiguring scar-formation remains. At this time the lesions of the osseous system occur, consisting of painful nodes under the periosteum of the involved bones; or in place of the nodules a diffuse periostitis may be present. The disease often terminates without the production of any lesions of the so-called tertiary stage.

Lesions rarely attack the mucous membranes, but during the secondary stage small granulomatous nodules and whitish patches resembling leukoplakia have been seen at the base of the tongue. The lymphatic glands, particularly the cervical and inguinal, are often enlarged, and are hard, painless, roundish or spindle-shaped, and suppurate only when secondarily infected. The appendages of the skin are exempt. Hyperidrosis appears to be a common complication. This may occur on the hands and feet; it not infrequently attacks the face. In general, a varying degree of anemia is noted, but the effect of the disease on the general health is not marked.

Etiology and Pathology.—The disease is rare among Europeans and also among the better class of natives. It occurs most commonly among the unclean and those living in overcrowded huts amidst unhygienic surroundings. Age and sex present no differences. The infective agent gains entrance to the system through an abrasion following insect-bites and other injuries. It is usually conveyed by direct contact from person to person. Castellani believes that the infectious material may be transmitted by flies and other insects. The direct cause is the *Spirocheta pertenuis*, discovered by Castellani in 1905, a delicate, spiral-shaped organism, varying in length from a few to 18 or 20 microns or more. As a rule, from 6 to 20 or more coils are noted. Morphologically, the organism resembles to a striking degree the *Spirocheta pallida* of syphilis. Animal experimentation and other tests have proved their non-identity. The disease has been reproduced by inoculation by a number of observers.

Histopathology.—The histological changes place the disease in the group of infectious granulomata. According to MacLeod,¹ the changes in the corium consist of a diffuse plasma-cell infiltration, with some mast-cells, connective-tissue cells, and small mononuclear cells; and marked extravasation of polymorphonuclear leukocytes, with attenuation of the collagen and elastin in the areas of densest infiltration. The blood-vessels are dilated, but do not show inflammatory changes in their walls. The hair-follicles, sebaceous glands, and coil-glands are unaffected. In the epidermis marked acanthosis occurs, with imperfect development of the transitional layers, and both hyperkeratosis and parakeratosis are noted in the stratum corneum. The chief histological differences noted between this disease and syphilis are as follows: In syphilis the plasma-cells are apt to be arranged in rows and clustered about the blood-vessels. In addition, there are multinuclear and incomplete giant-cells and intracellular hyaline degeneration. There also occurs an endarteritis, with proliferative changes in the vessel-walls.

Diagnosis.—The disorder is to be differentiated chiefly from syphilis. Some early observers, including Hutchinson, believed the diseases to be identical. All doubt concerning this matter has been dispelled by recent findings. Clinically, the following are important points of dis-

¹ Brit. Med. Jour., September 21, 1901.

tingtion: Syphilis often, frambesia rarely, attacks the mucous surfaces. The last-named disease much more rarely involves the lymphatic glands. There is usually itching in frambesia, which is not characteristic of syphilis. The characteristic lesion of frambesia is not seen in syphilis. The papules of the former are usually described as having a yellow, waxy crust, with honey-like serum beneath; those of syphilis, on the other hand, have a peculiar color and do not undergo this change. Clark¹ describes cases of ringworm yaws that resemble closely the annular, papular syphiloderm as seen both in the negro and other races. Syphilis is directly hereditary; frambesia, though common in children, is not inherited; healthy parents frequently contract the disease from their children. A very sharp distinction occurs in the early lesions of the two disorders.

Treatment.—The general treatment of the disease consists in the administration of tonics, the use of proper food, and in securing proper hygienic surroundings. Mercury and potassium iodid have been of value internally, but in the recent preparation of Ehrlich a specific method of treatment has apparently been evolved. Many observers report complete eradication of the disorder with a single injection of this remedy. Among others, the disease has been treated successfully with salvarsan by Castellani,² Rost,³ and Cockin.⁴ The local treatment consists of the usual antiseptic surgical washes and dressings.

Prognosis.—The disease is not serious, relative to the life of the patient. In young children and debilitated older subjects it is of more consequence. Occurring in epidemic form on plantations, it interferes more or less seriously with labor conditions.

VERRUGA PERUANA.⁵

Synonyms.—Peruvian Wart, Oroya Fever, Carrion's Disease.

Verruga Peruana was described first in the sixteenth century by Zarate, of Lima, in his *History of the Conquest of Peru* (1543). The first scientific contribution to the subject was made by Tschudi, in 1845. The disease formerly had a more extensive distribution than at the present time. It is supposed to have occurred in Ecuador, Bolivia, and Chile. At present it is largely limited to certain narrow valleys on the western slopes of the Peruvian Andes, between latitudes 8 and 13 south, and at altitudes of from 1000 to 12,000 feet. The disease is never contracted in the lower coastal plain, but always

¹ Jour. Cut. Dis., 1914, xxxii, p. 18.

² Loc. cit.

³ Münch. med. Wochenschr., 1912, lix, No. 17, p. 924; abstr. Jour. Cut. Dis., 1912, xxx, p. 627.

⁴ Jour. Tropical Medicine and Hygiene, September 2, 1912, xv, p. 277; abstr. Jour. Cut. Dis., 1913, xxxi, p. 65.

⁵ Tschudi, Arch. f. phys. Heilk., 1845, p. 378; Matas, Morrow's System, iii, p. 694; Scheube, Diseases of Warm Countries, 1903, 2d ed., p. 298; Manson, Tropical Diseases, 1910, 4th ed., p. 580; Stelwagon, Diseases of the Skin, 7th ed., 1914, p. 859; Darling, Jour. Amer. Med. Assoc., 1911, lvii, p. 2071; Gilton, ibid., p. 2074; Castellani and Chalmers, Manual of Tropical Medicine, 2d ed., p. 1196.

in the valleys at the higher altitudes mentioned, not less than 16 to 36 miles from the sea (Darling). It does not occur on the eastern face of the Andes. In America a case has been recorded by Stelwagon.

Definition.—Verruga Peruana is an infectious disease, characterized by constitutional symptoms, the cardinal one of which is a severe grade of anemia, and a cutaneous eruption of warty nature, having a tendency to bleed.

Symptoms.—Two forms of the disorder are described, a mild and a severe. The incubation period varies from fifteen to forty days. In Carrion's case it was twenty-one days. During the stage of invasion, headache, pains in the extremities, fever, chills, anorexia, and insomnia are noted. The fever is of a remittent or intermittent type. The liver and lymph-glands become enlarged; and the anemia is of such a severe grade that the red cells may become reduced to one million or even five hundred thousand per cubic millimeter. In severe cases a fatal result may occur within three or four weeks. In mild cases the constitutional symptoms are less marked, the anemia being of a milder grade, and after a duration of three or four weeks to several months cutaneous manifestations occur.

The eruption occurs chiefly on the extensor surfaces of the arms and legs, also on the face and neck. In addition, the mucous membrane of the lips, tongue, gums, palate, and pharynx may become involved, as well as the serous membranes of the internal organs. The cutaneous lesions begin as slightly elevated, pinkish or reddish spots, which later assume a dusky, bluish-red hue. There may be associated vesicles, bullæ, or pustules. These lesions rapidly develop into papules, and later into nodules, which are conical or hemigloboid in shape, and vary in size from that of a pea to a bean. When fully developed, they appear as irregular, wart-like lesions, usually discrete, of a red color, firm or soft to the touch, sessile or pedunculated, cylindrical, papillomatous, and hemorrhagic. In addition to these, a subcutaneous, nodular type of lesion occurs, which may develop into large size. These approach the surface, to which they become attached, and finally break down, producing deep ulcers, furnishing a fetid discharge, which may also be the seat of abundant hemorrhage. In these the lesion is transformed into a malignant-looking, grayish or blackish, spongy mass, covered with brownish crusts, and exhaling a putrescent fœtor. The lesions vary in number from a few to a great many. During a period of several months new groups appear, each being accompanied by constitutional symptoms. The disorder, unless fatal, finally disappears by absorption of the nodules and cicatrization of the ulcers.

Etiology.—The disease is transmissible by inoculation, as was evidenced in the case of the physician Carrion, who, after inoculation in both arms with the blood of a patient, perished in fifteen days. His name added to the list of titles given above is a memorial to this sacrifice. The disease attacks persons of both sexes and all ages, including new-born infants. Persons working in the earth are especi-

ally liable to contract the disorder. It seems further to be aggravated by conditions of moisture and warmth. An organism, apparently a bacillus, described by Barton (quoted by Darling), is found in the red-blood cells during the febrile period, and also in the local lesions. These bodies have been the subject of much discussion, and Darling believes them to be a unique type of microorganism. The histology of the disease shows it to be a granuloma, similar in some respects to that of frambesia. A cellular infiltration, held together by a delicate fibrous stroma, caused early observers to compare the lesions to sarcoma.

Diagnosis.—The disorder chiefly resembles frambesia, and the most important factor in diagnosis is the residence of the patient. It is said that natives become immune to the disease, but that strangers going through infected districts are speedily attacked.

Treatment.—The treatment requires the removal of the patient to a climate where the disease is not endemic. Arsenic by hypodermic injection has been recommended. Castellani suggests salvarsan and neosalvarsan. In convalescent stages tonics should be employed.

Prognosis.—The disease may run its course in a few days or be prolonged for many months. The mortality varies from 10 to 40 per cent. Complications arising render the prognosis unfavorable. Among these are intestinal hemorrhages, hematuria, metrorrhagia, hemoptysis, epileptiform convulsions, and meningitis.

GANGOSA.

Gangosa is a disorder endemic in certain countries, such as Bolivia, the Philippine and Caroline Islands, British Guiana, Jamaica and other parts of the West Indies, but especially in the island of Guam, where it is said to have existed for the last 150 years.

The disease in many of its features strongly suggests rhinoscleroma, a malady with which some authors hold it to be identical.

Symptoms.—Gangosa is characterized by a destructive ulceration, commonly beginning by attacking the soft palate, pillars, or uvula, and extending thence to the hard palate and the nasal cavity, downward to the larynx and upward to the face. The destructive process is either acute or chronic, and may terminate either by cicatrization or by extensive destruction of tissue with mutilation. Constitutional symptoms are wanting or developed in very mild forms.¹

Geiger recognizes three types of ulceration of the upper air-passages common in the island of Guam: (a) septic forms due to the usual

¹ Mink and McLean, *Jour. Amer. Med. Assoc.*, October 13, 1906, p. 1166, and supplementary paper *Jour. Cut. Dis.*, 1907, xxv, p. 503; Fordyce and Arnold, *Jour. Cut. Dis.*, 1906, xxiv, p. 1; Lyes, *Jour. Trop. Med.*, February 15, 1906; Senn, *Jour. Amer. Med. Assoc.*, January 11, 1908, p. 116; Geiger, *U. S. N. Med. Bull.*, January, 1908; E. R. Stitt, *Jour. Cut. Dis.*, 1908, xxvi, p. 103; idem., *U. S. N. Med. Bull.*, 1907, i, p. 96; Musgrave and Marshall, *The Philippine Jour. of Sci.*, ii, No. 4, Section B, 1907, abstr. *Brit. Jour. Derm.*, 1908, xx, p. 173 (Gangosa in the Philippine Islands. A case occurring in a Philippine, a native of the Batan Islands).

pyogenic organisms; (b) ulcerations that are obdurate to antiseptic treatment, a group inclusive of most forms of gangosa; (c) distinct nodules or tubercles, involving the skin or mucous membrane of the nose, soft palate, pharynx, larynx, or lips. An organism closely resembling the bacillus of diphtheria has been recognized in every case examined by Geiger, and was found in pure culture in the conjunctival sac when the eyes were involved.

FIG. 233



Gangosa. (Fordyce.)

The disease is contagious, transmitted by direct contact, and is diminishing in those places where segregation is practised. It occurs almost exclusively among the natives of the countries mentioned, though Stitt's case was that of a sailor (white) who had been in Guam. No positive etiological factor has been identified, except that of Geiger above mentioned. The disease progresses indefinitely, but in itself is not grave as to the life of the patient.

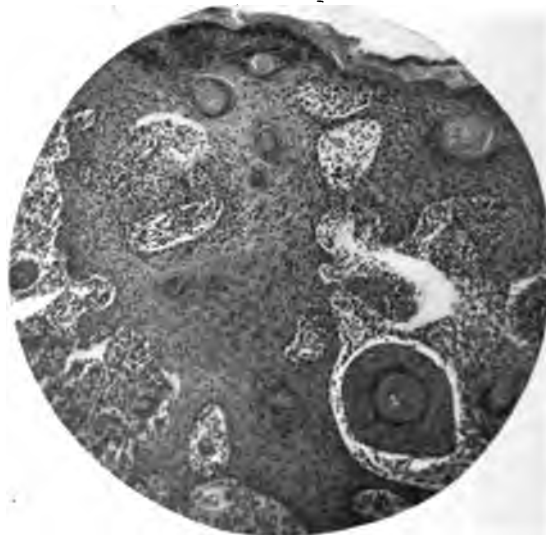
The histological findings vary, but all agree that it is a form of granuloma. In Fordyce's case a granuloma with small lymphocytes.

FIG. 234



Gangosa. Showing the diffuse infiltration of the corium with round-, plasma-, and giant-cells. The vessels are the seat of an endarteritis, many of them being obliterated. (Fordyce.)

FIG. 235



Gangosa. Tropical ulceration involving nose, pharynx, and larynx. Hyperplasia and downgrowth of the epidermis, with cellular infiltration of round-, plasma-, and giant-cells in the corium. (Fordyce.)

plasma-cells, mast-cells, epithelioid- and giant-cells was found; but tuberculosis was ruled out by the absence of the bacillus and negative animal experiments and tuberculin tests.

Diagnosis.—The disease is to be distinguished from Vincent's angina by the absence of the causative microorganism of the latter disorder; from syphilis, by the lack of response to the treatment employed for the latter, and by the fact that in Guam, the home of gangosa, syphilis is rare. It is also to be distinguished from yaws and tuberculosis.

Treatment.—Treatment has only a palliative effect. Local anti-septic measures, with cauterization in early cases, is recommended. The general health is to be promoted by appropriate measures.

ULCERATING GRANULOMA OF THE PUDENDA.¹

Synonyms.—Serpiginous Ulceration of the Genitals, Groin Ulceration, Sclerotizing Granuloma of the Pudenda, Perforating Granuloma of the Thigh, Granuloma Inguinale Tropicum. Ger., Das Venerische Granulom.

In 1896 Congers and Daniels first recorded observations of this disease in negroes resident in British Guiana and among East Indians. The malady has since been observed among the natives of the Fiji and Solomon Islands and the New Hebrides. Contributions to the subject have been made by MacLeod, Manson, Grindon,² and others.

Symptoms.—The disease occurs in both sexes after the puberal epoch, but chiefly in women. It is seen most often in the genital region and the parts provided with long hairs, but it has been observed on the cheeks, the lips, and inside the mouth. The lesions are vivid-hued, shining, verrucous, vegetating nodules of granulation-tissue. These are at first circumscribed thickenings and elevations. The thin overlying epidermis is excoriated readily, and exposes a hemorrhagic surface, which may ulcerate. The granuloma spreads both by autoinfection and peripheral extension, producing eventually, possibly after years of slow extension, a dense, contracting, irregularly nodulated scar-tissue, here and there sprinkled with islets of actively progressing disease. Unevenly pigmented areas are made up of excoriated or partly cicatrized and corded tissue, often with a narrow, serpiginous, elevated, glazed, pinkish or reddish border. The process is superficial, and as a rule unaccompanied by coincident adenopathy.

¹ Congers and Daniels, Brit. Guiana Med. Ann., 1896, viii, p. 13. Crocker, Diseases of the Skin, p. 1076; Jour. Cut. Dis., 1908, xxvi, p. 61. Daniels, Brit. Guiana Med. Ann., 1898, x, p. 49. Galloway, Brit. Jour. Derm., 1897, ix, p. 133. K. MacLeod, Jour. of Trop. Med., 1899, p. 175. J. Maitland, Lancet, 1899, ii, p. 1624. Manson, Tropical Diseases, 1910, 4th ed., p. 583. A. Powell, Ind. Med. Gaz., 1899, p. 187. Scheube, Diseases of Warm Countries, 1903, p. 541. Sequeira, Brit. Med. Jour., March 7, 1908. Cleland and Hickinbotham, Jour. Trop. Med. and Hygiene, May 15, 1909, p. 143; abstr. Brit. Jour. Derm., 1909, xxi, p. 335 (On the Etiology of Ulcerative Granuloma of the Pudenda).

² Jour. Cut. Dis., 1913, xxxi, p. 236 (report of three cases, with histological study).

The parts most often invaded are the labia and the vagina of women; in men, the penis, urethra, and scrotum; in both sexes the ano-rectal region, pubes, groins, and rarely the bladder. Subjective sensations are not conspicuous; anemia and cachexia occasionally result. Offensive discharges are produced in advanced cases. The disease is aggravated in regions of pressure, friction, and moisture. Manson describes the affected surface as "an area of white or irregularly pigmented, perhaps excoriated, contracting, folded, and dense cicatrix, surrounded by a narrow, serpiginous, irregular border of nodulated, somewhat raised, red, glazed, delicately skinned or pinkish, superficially ulcerated or cracked new-growth."

Etiology.—The disease attacks persons of all races, but chiefly negroes; and individuals of both sexes, but mostly women. The subjects are, as a rule, young adults, though the disease is seen in aged persons. The affection is contagious, autoinoculable, and frequently venereal in origin, though not syphilitic. The precise character of its virus is not known.

Histologically, the disease is seen to be a granuloma. Galloway¹ found a more or less profuse cellular infiltration, beginning in the upper regions of the corium, extending into the papillæ, and also to a variable extent downward. The infiltration was composed of leukocytes, plasma-cells, mast-cells, and connective-tissue corpuscles. There were no multinuclear or giant-cells. In the areas of cellular infiltration the collagen and elastin had degenerated and were destroyed. The blood-vessels showed moderate dilatation. The epidermis over the infiltration showed edema and was stretched and thinned, and in it there was a certain amount of leukocytic infiltration. Donovan (cited by Manson) has recognized in scrapings from the lesions a gigantic short bacillus, 1 by 2 microns in length, with rounded extremities, abundant in mononuclear leukocytes. In addition to this, several microorganisms have been described: a spirocheta (Wise, Cleland and Hickinbotham), and a capsulated, intracellular diplobacillus (Siebert, Flu, and others). Other observers have found no microorganisms other than contaminations (Grindon, Choyce and MacCormac).

Diagnosis.—The disease is to be differentiated from syphilis by the absence of adenopathy, by the extreme chronicity of the process (at times extending over ten years with but few changes), and by the special features outlined above. It is not amenable to antisyphilitic treatment.

Treatment.—Treatment is by excision, which Manson prefers on account of the marked tendency to recurrence in many cases. Curettage and subsequent cauterization have been successful. Mercury and iodine salts are of little if any value. Salvarsan² also is disappointing. Radiotherapy has been employed with success.³

¹ Brit. Jour. Derm., 1897, ix, p. 133.

² Choyce and MacCormac, *ibid.*, 1913, xxv, p. 65.

³ MacLeod, *ibid.*, p. 66.

CLASS VII.
NEUROSES.

PRURITUS.¹

The term *pruritus* should be reserved to denote a disease of the skin characterized by itching, burning, or smarting sensations, primarily unaccompanied by lesional changes. Hebra was first to recognize the independent character of the disease as thus defined; but it is to be regretted that he did not give it a distinct name from that which is also applied to a symptom common to several maladies of the skin. It is a sensory neurosis, in which itching, burning, and smarting are the essential symptoms. It may be general or local. In either form it begins usually by a tickling, pricking, crawling, or itching sensation in the skin, which causes the sufferer to rub, press, scratch, or otherwise irritate the affected integument. Other symptoms are usually present, however, and are evidenced locally by the torn and injured skin, and systemically by varying degrees of malnutrition and lowered vitality of the patient through loss of rest.

General Pruritus (*Pruritus Essentialis*).—General pruritus occurs usually in adults, a common example being the so-called *senile pruritus*. Although all parts of the cutaneous surface are liable to be attacked, it rarely attacks the whole surface simultaneously, but moves about from area to area. The itching may be intense. It is worse at night, but occurs more or less throughout the day, the morning hours being the least uncomfortable. The intensity and discomfort are sometimes relieved only by producing sufficient trauma to change the sensation from itching to one of burning and smarting. The paroxysms are of varying duration, and may be precipitated or accelerated by various influences. Thus, mental disturbance, a draft of cool air, the warmth perceived when in bed, the pressure of clothing, and often the substances applied externally for relief of the itching, suffice to determine a crisis. However firmly the sufferer may resolve to avoid injury to the skin, in a well-marked case the impulse to scratch becomes almost irresistible and in the highest degree tormenting. Many of these patients restrain themselves and avoid scratching during the waking hours, but while asleep inflict serious damage upon their skins. When the itching becomes intense, brushes, combs, coarse cloths, and even metal instruments, are employed for the purpose of assuaging temporarily the local distress.

¹ For fuller discussion of the subject and bibliography, see Jacquet, *La Pratique Dermatologique*, iv, p. 341.

The objective cutaneous symptoms which may be present are all secondary, and invariably result from self-inflicted injury. In many cases they do not appear, the statements of the patient being the sole basis for the recognition of the disease. This absence may be the consequence of unwonted self-control, mildness of the malady, or the transitory character of the lesions produced. Thus, the skin may be reddened during a nocturnal paroxysm under the manipulation of the sufferer, and the transitory hyperemia disappear in the daytime, when the skin is submitted for inspection. Not rarely, however, the skin resents the treatment to which it is subjected, by displaying wheals, hyperemic blotches, reddened papules, excoriations, characteristic "scratch-lines," and minute blood-crusts; in other words, may present all the symptoms of a traumatic dermatitis, which in certain cases may develop into a true eczema, that still further adds to the subjective distress. Skins that for years have been the seat of a persistent pruritus, leading to traumatism of the epidermis, frequently show smaller or larger areas of deep pigmentation.

Senile Pruritus.—Senile pruritus is a term loosely applied to any form of the disease occurring in the aged, in whom it is very common. In this variety the pruritus is usually of a generalized distribution, with the trunk chiefly involved. Senile pruritus, properly, is that form of the disease due to atrophic and degenerative changes in the skin and other tissues of the aged, and is usually a serious disease. Patients of sufficient age to have this form, but whose skins do not show senile changes, are not infrequently attacked with the disease, and in these instances it is due to the causes operative in other generalized cases.

Local Pruritus (*Local Pruritus Essentialis*).—In local pruritus the areas attacked are the anal, vulvar, and scrotal regions chiefly, and occasionally the palms, face, and scalp.

Pruritus Ani.—This disorder may be limited to the anus and anogenital region, or be experienced over the neighboring parts (genital region, cleft of the nates, buttocks, and upper and inner parts of the thighs). It is a disorder of exceeding persistence when not properly treated, and accompanied by local distress (itching, burning) of a severe grade. In men the scrotal or anal region alone or in combination with the perineum may be attacked. The skin about the anus presents a whitish, sodden appearance, with increase in depth of the folds, in which there collects a foul-smelling secretion. Frequently, the intensity of the itching in these cases cannot be described. Naturally, in time local inflammatory symptoms develop, due to the scratching and rubbing, resulting in excoriations, fissures, crusting, induration, hyper- or deep pigmentation, and extensive thickening of the nates, as well as in a true eczema. The methods of obtaining relief employed by some of these victims of intense suffering testify strongly to its severity. The most severe types are seen in men, though both sexes are affected, and the subjects are commonly those in middle or later life. Instances of severe pruritus ani in children, however, are on

record. When the disorder extends to and involves the scrotum in men, this becomes thickened and soggy, and may even become vitiliginous.

Pruritus Vulvæ.—This may be a disorder of mild grade or be productive of so much torture that after long deprivation from sleep and profound agitation of the nervous system, the unfortunate sufferers have been tempted to commit suicide.

Like pruritus ani, that of the vulva may be limited to the genital region (mucous, muco-cutaneous, or cutaneous surface adjoining the latter, the outer faces of the labia majora, the labio-femoral clefts, and the perineum), or it may extend to and involve the anus and neighboring parts. The tissues, from much scratching and rubbing, are usually tumid and dry, rather than moist, are reddened in various grades, and often excoriated, crusted, torn, and in extreme cases affected with marked deformity. All the muco-cutaneous tissues, the labia minor, clitoris, and vaginal membrane adjacent may be swollen several times beyond the normal.

Other cases of local pruritus are more rare. Those occurring on the palms, for anatomical reasons, are not accompanied by marked secondary lesions. The pruritus limited to the scalp and face is not common, but is seen occasionally.

Pruritus narium is a frequent symptom of irritation of the Schneiderian membrane. It is thus a common precursor or an attendant phenomenon of rose- or hay-erythema, and in some individuals announces the symptomatic effect of the ingestion of opium and its alkaloids. We have seen cases limited to the nose, cheeks, and chin that have lasted for several years, each accompanied by a moderate traumatic dermatitis. Pruritus of the tongue is reported in a few instances. It is usually due to a central neurosis, to glycosuria, or other systemic disorder. At times one small area may be noted over the course of a special nerve. The author examined a case in which the itching extended in a narrow band from the vulva along the entire length of the leg, terminating at the heel.

Another important variety of essential pruritus, which might be properly classed as a seasonal neurosis, is that described by Duhring under the title of **Pruritus Hiemalis** (*Prurigo Hiemalis*, "*Frost Itch*," *Winter Prurigo*). This disorder was first described by Duhring,¹ in 1874. It was later independently described by Hutchinson,² and was subsequently made the subject of study by Hyde,³ Corlett,⁴ Payne,⁵ and others.

This disorder occurs in the autumn and winter, and becomes milder and clears up with the approach of warm weather. The chief and essential symptom is itching, which occurs upon disrobing and retiring. It possesses many features in common with the forms of pruritus

¹ Philadelphia Med. Times, January 10, 1874. ² Brit. Med. Jour., 1875, ii, p. 773.

³ Chicago Med. Jour. and Exam. March, 1885, and February, 1886.

⁴ Jour. Cut. Dis., 1891, ix, p. 41, and Jour. Amer. Med. Assoc., 1902, xxxix, p. 1583.

⁵ Brit. Med. Jour., 1887, i, p. 985.

already described, including variability in the subjective sensations awakened, nocturnal exacerbation, and the absence of primary eruption. The secondary results are also similar, being sequels of self-inflicted injury in the form of roughness, perifollicular redness and papulation, torn and fractured hairs, excoriations, blood-crusts, and, in severe cases, an induced dermatitis. The disorder is due to changes incident to cold weather, and is often aggravated by the coarse woolen underclothing worn at this season, though it occurs also in those whose personal habits as to clothing and cleanliness leave nothing to be desired. It abates in severity with a rise of atmospheric temperature, though there is occasionally noted persistence of distress after such weather changes. At times several members of a family are attacked simultaneously or successively, which fact has led often to the erroneous belief that it is contagious. The affection, moreover, is one which occurs in persons otherwise enjoying perfect health and in those of every social grade.

The parts attacked are commonly the antero-internal aspect of the thighs, the calves of the legs, around the joints, and, to a lesser degree, the forearms and other parts of the body. It is without question a disease of northern climates, more particularly those where the variations of temperature between the summer and winter range between -30° F. and $+100^{\circ}$ F. The description by Duhring presents a picture with an accuracy verified by clinical observation, which justifies the recognition of the disease as a form of cutaneous pruritus.

Bath Pruritus.—Stelwagon¹ described a variety of pruritus occurring in patients immediately following a bath. The sensations are itching and burning of varying intensity. It usually occurs on the lower part of the body, from the hips down, but occasionally involves the arms also. It lasts from a few moments to an hour or so and gradually subsides. It attacks adults more frequently and those who habitually have an irritable, dry skin. The temperature of the water appears to have little to do with the condition, as any temperature produces the same result.

Prairie Itch.—This is a popular term applied largely in the Western, Northwestern, and Southern States of America to a cutaneous affection productive of itching sensations. It is supposed to be the disorder popularly described as "Texas mange," "Ohio scratches," "swamp itch," and "lumberman's itch." A parasitic origin has been claimed for it by several observers, who also insist upon its contagious character and its curability by parasiticides. In 1885-86, Dr. Hyde² published two articles on this subject, in which many letters of practitioners of medicine were quoted, showing the confusion and perplexity existing in regard to it.³ From the titles above mentioned, it is seen at once that geographical distribution had to do with their naming. It is generally conceded by authorities on this subject that the bulk of the cases

¹ Philadelphia Med. Jour., 1898, ii, p. 863.

² Chicago Med. Jour. and Exam., 1885, lii, p. 187; *ibid.*, 1886, iii, p. 116.

³ Jones, Kansas City Med. Index, 1886, with views of several Western physicians; Clark, Med. Age, 1886.

variously named belong in one of four categories: pruritus essentialis, pruritus hiemalis, scabies, or, as more recently suggested by Stelwagon,¹ a disorder of the skin now described as "straw itch," "grain itch," or "grain mite dermatitis," produced by the *Pediculoides ventricosus*. From the above, it is seen that prairie itch cannot be considered a distinct disease, but the term is descriptive of many diseases misinterpreted.

Etiology.—In every case of pruritus a probable cause must be diligently sought. While pruritus cutaneus is dignified by a name and described as a disease *per se*, it is essentially a symptom of some disturbance, local or more or less general, of the nervous system; and this disturbance is further secondary to many and varied internal and local organic and functional diseases, and even to increased or decreased physiological activity, as exhibited in pregnancy and the menopause; and finally to abnormal mental states. Bronson² states that hyperesthesia is the chief predisposing cause in all cases. This hyperesthesia may be acquired by long-continued irritation of the cutaneous nerves in various itching dermatoses, such as eczema, lichen planus, or scabies, or it may be inherited. The disease may occur at all periods of life and in both sexes, but its aggravated forms are peculiar to middle life and advanced years. Functional or organic disease of the stomach, intestines (including the rectum), liver, kidneys, bladder, urethra, uterus, or ovaries may be causative. The intense itching accompanying icterus is well known, and this often appears only when the icterus is subsiding. An unaccountable pruritus may be the earliest symptom of an internal carcinoma. Malaria, tuberculosis, diabetes, and various forms of nephritis are all causative. Pregnancy is often accompanied by local or more or less generalized pruritus. At the menopause in women, when the organs of reproduction are undergoing organic changes, pruritus occurs, and may be due to reflex local irritation or to the changes incident to the general effect this state produces on the nervous system as a whole. Common among local causes of pruritus is constipation. The hard fecal matter lying in the rectum sets up a reflex irritation, as do also varicose veins and ascarides in this locality. Fistulæ, fissures, and local hyperidrosis are causative. In the genito-urinary tract vesical calculi, polypi, and stricture may be effective.

Reflexly, general pruritus may be caused by a local pruritus. For example, severe generalized cases have occurred in people the subjects of an anal pruritus, the whole disease clearing up by treating simply the local disease.

At times psychic disturbances produce pruritus. This may be seen when a class of medical students or nurses is suddenly attacked by real pruritus when viewing a patient covered with pediculi. Another example of this form occurs in patients who believe themselves to be infected with certain parasites. While a real mental disorder may be

¹ Diseases of the Skin, 7th ed., 1913, p. 944.

² The Etiology of Itching, Med. Record, October 24, 1891 (a careful review of the subject).

present in these patients, they suffer intensely with itching, and not infrequently declare that they not only feel the parasites, but see them emerging from the skin and are able to catch quantities of them. The moral emotions of a depressive character and mental distress occasioned by a variety of circumstances often find physical expression in the disorder.

Pathology.—The disease is essentially a functional disorder of the nerves of sensation supplied to the skin, and of itself is incapable of producing objective symptoms. This fact can, in some cases, be clinically demonstrated, as the seat of the pruritus, even though exhibiting artificially produced lesions, will, when protected from external injury, speedily regain its normal appearance, the pruritus continuing, nevertheless. It is probable, though not certain, that the nerves also in this disease undergo no structural change, but merely convey to the periphery a perverted sensation, that is often reflected from some centric point of disturbance.

Diagnosis.—The recognition of general pruritus is usually not difficult, though the secondary results of the disorder are apt to be less characteristic than its early phenomena. The complaint of the patient, the absence of cutaneous disease sufficient to explain the symptoms, and especially the discovery of an efficient cause in some visceral or systemic disorder, are all significant.

One of the most constant features of general pruritus is visible only when the clothing of the patient is entirely removed. It then becomes evident that the affected regions are, in order of frequency, those most accessible to the hands. The posterior body-surfaces are much less involved than the anterior. The small of the back and interscapular regions are usually untouched. The anterior surface of the legs shows more evidence of trauma than the calves, and the forearms more than the upper arms. The lower abdomen and the inner faces of the thighs are more severely attacked than the breast and outer faces of the thighs and hips. The clavicular regions are more excoriated than the back of the neck.

It must be admitted, however, that when the disease is localized, and complicated, as it frequently is, by an eczema or dermatitis, doubt may arise. Attention should then be paid to the history of the disorder, which may reveal the fact that the pruritus preceded for some time the cutaneous symptoms, and may disclose even more. Intelligent patients will often assure the physician of the real nature of the malady by voluntarily remarking that the skin symptoms disappear upon the region that is not scratched, though the itching continues. In all cases the influence of externally operating agencies should be carefully eliminated. The fact that pediculi, fleas, and bed-bugs may induce severe itching should be borne in mind. The differentiation between scabies and pruritus hiemalis is important (*Cf.* section on Scabies).

Treatment.—The treatment of any case of pruritus is simple if the etiology is clear. In many cases this cannot be clearly determined,

and then recourse to some of the general rules laid down must be resorted to. There are some general principles of treatment, both as to internal and local management, which are of great value, both in mitigating and completely relieving the disorder. As a rule, constitutional treatment is unsatisfactory, unless especially directed to some discoverable etiologic factor, such as diabetes, rheumatism, or the various hepatic, renal and other diseases concerned in its production.

All internal causes of cutaneous irritation should as far as possible be removed, and to this end attention should be directed particularly to any medication to which the patient may have been subjected, and which may have aggravated the complaint, and also to the diet, which should be regulated in accordance with the principles given under *Urticaria*.

In atonic conditions strychnin, iron, arsenic, and other tonics are indicated. The nutrition of the nerves and of the skin can often be improved by the judicious use of cod-liver oil and other fats.

The attempt to relieve pruritus by the internal use of sedatives is to be recommended only in extreme cases. The narcotics, while they may give temporary relief, tend to relax the skin and in the end to aggravate the disorder. This is especially true of the preparations of opium. The bromids, antipyrin, phenacetin, sulfonal, or even chloral, may be given for brief periods in extreme cases, but always with the understanding that any one of these remedies, after temporary relief, may aggravate the condition for which it was given. Furthermore, there are strong reasons for refusing to employ in pruritic disorders preparations containing opium, cocain, *cannabis indica*, conium, and other drugs intended to relieve the subjective sensations by internal medication. Many well-nigh incurable cases of the "cocain habit" have been begotten by treatment of this sort when the patient, especially if a nervous woman with an intolerable pruritus *vulvæ*, is in a condition peculiarly susceptible to the action of remedies of this class. These drugs should always be regarded as the last resort of the practitioner, and a confession of weakness in not discovering the special cause effective in the case.

Cathartics and laxatives and an abundant supply of pure water internally, employed as directed for relief of acute eczema, as well as diaphoretics and diuretics, are often of value in eliminating toxins to which pruritus may be due, in depleting the cutaneous vessels, and possibly, in a reflex way, by diverting irritation to other regions. *Jaborandi* and *pilocarpin* have thus been employed to advantage. In children full doses of quinin sometimes relieve pruritus, while in adults large doses of calcium chlorid¹ occasionally will accomplish the same result. *Cannabis indica* and *gelsemium* at times are effective, but should be prescribed with great caution. Aspirin is probably the least harmful and the most efficient of internal remedial agents.

¹ Savill, London *Lancet*, August, 1906.

The indications for local treatment are to protect the skin from all sources of irritation and to relieve the itching. Hyperesthesia of the skin is common in pruritus, either as a predisposing cause or as a result of long-continued itching. In consequence, very slight external irritation may suffice greatly to aggravate the itching, and every precaution should be taken to protect the skin from exposure of all kinds. First in importance is the clothing. The garments worn next the skin should be of cotton, lisle-thread, linen, or silk, never of wool, and the meshes should be filled with an impalpable powder to reduce to a minimum the friction of the garments on the skin. All other clothing should be as light as possible and yet be warm enough for protection. If the patient live in a climate where sudden changes in temperature are common, the clothing should be regulated accordingly. The object is to keep the skin at an even temperature and to protect it from sudden changes. In cases in which the pruritus is due largely to the hyperesthesia, the itching may be entirely relieved by dusting the surface with a simple powder and completely covering it with a layer of cotton-wool or other protective dressing.

Hot baths, unless specially indicated, and the too free use of soap may render the skin unduly sensitive. The bran, oatmeal, alkaline, and other demulcent baths recommended in the chapter on General Therapeutics are those most generally useful. After the bath, the surface should be patted (not rubbed) dry and covered with a dusting-powder or other selected application. When the skin is free from excoriations and other lesions, the cold douche, alternate hot and cold douching or sponging, or even the cold salt-water sponge, may be used to improve its tone and vigor.

Scratching is a common source of irritation and one that is difficult to set aside. Until this is accomplished, however, relief cannot be obtained, as wherever the skin is scratched or rubbed there is produced a local hyperemia, or even a dermatitis, which adds to the cutaneous irritation, not only at the site of the rubbing, but also by reflex action in other regions of the body. It is not sufficient to tell the patient not to scratch; the surface must be protected by proper dressings, and the itching relieved by the use of antipruritics. Bronson suggests that patients be allowed to obtain relief at times by firmly pressing upon the surface or by gently drawing over it an oiled or a wet cloth.

The substances which have been employed topically for the relief of pruritus cutaneous are almost without number, a fact warranting the conclusion, corroborated in every wide experience, that each occasionally fails to afford the desired relief. That preparation, moreover, which is at one time of the highest value, at another period in the history of the same case will disappoint. Attempts to secure relief by such topical applications should, however, always be made, and will often be followed by gratifying results.

The sedative and antipruritic lotions, lead-water, lead-and-opium wash, liniments, and dusting-powders described elsewhere, together

with their methods of preparation and application, are valuable and sufficient in most cases. They may be further modified by the addition of substances recommended in the following paragraphs. The dusting-powders are of special value in furnishing mechanical protection. When a decided antipruritic effect is desired, the Anderson, or a similar powder, may be used. In some localized forms of pruritus, more complete protection with ointments, pastes, or even the glyco-gelatins, may be secured.

Of all antipruritics, phenol easily takes first place. In most of the lotions recommended above it is used in strength of 1 to 5 per cent. In oils or liniments it may be used much stronger. Bronson uses it even to 25 per cent., stating that it is much more slowly absorbed than in aqueous solutions, and therefore less likely to produce systemic effects. A favorite formula with him is the following:

R—Phenolis,	3j-ij;	4-8
Liq. potass.,	3j;	4
Ol. lini.,	3j;	30' M.

It is to be shaken before using, and may be scented with bergamot. These stronger preparations of phenol, even in the oils, should be used over only small areas, for fear of toxic effects. The possibility of producing gangrene by the long-continued application of even weak solutions of phenol should not be forgotten.

Other remedies that may be used in lotion, oil, liniment, ointment, or paste, in strengths varying from 1 to 5 per cent. or more, are: salicylic acid, hydrocyanic acid, menthol, camphor, thymol, salol, creosote, the tars, chloral, and chloroform. Two or more of these remedies may be combined in the same lotion. Morphin, atropin, and cocain may be added to lotions with occasional advantage.

Ointments and pastes are irritating to many pruritic skins, but at times are more acceptable than the lotions and oils. In abnormally dry skins and in some cases of bath-pruritus, a simple oiling of the skin often gives prompt relief.

Chloral-camphor, a pungent, syrupy liquid obtained by triturating an equal amount of the two substances to a fine powder, is an antipruritic remedy of value in certain cases if applied in a salve containing 1 drachm (4.) to the ounce (30.) of salve, and is comparable in its action to phenol-camphor, described in the chapter on General Therapeutics. Among other remedies occasionally of service are ichthyol, resorcin, and mercuric chlorid. Bronson speaks highly of hydrogen peroxid. In atonic cases, with diminution of the tactile sense, the use of electricity over the spine has been followed by good results.

In senile pruritus the progressive atrophy and degeneration of tissues may be checked or retarded by management proper to each case. Locally, electricity or hot and cold douches may aid in stimulating the skin to renewed vigor. Keeping the skin soft with daily inunctions of oil or a thin ointment is an effective measure in many cases. Lastly, many cases of intractable pruritus are best managed

when the attention of the patient is diverted from the malady by the distraction incident to travel, aided by change of scene and climate.

Treatment of the regional forms of pruritus is that above described, with such modifications in the dressings as may be necessitated by the special location.

Locally, heat in the form of hot oatmeal-water or ordinary hot water gives prompt and sometimes lasting relief. This may be employed each evening before the medicament selected is applied. The following articles give most relief in the local cases: phenol, in oil or lotion; thymol or menthol, in an ointment; resorcin, in lotion or ointment; camphor, in an ointment or dusting-powder; chloral, in an ointment or lotion; and the tars, in lotion or ointment. Particular directions must be given concerning the proper method of applying these preparations and their subsequent reactions.

Fissures and areas of infiltration may be painted with compound tincture of benzoin, tincture of iodine, or solutions of silver nitrate containing gr. x to ʒj (0.66-4.) to the ounce.

For pruritus of the vulva, Wiltshire¹ recommends decoctions of almond-meal, marshmallow, slippery-elm, and rice; and in case of failure of the latter, an infusion of tobacco, 2 ounces (60.) to the pint (480.). Vaginal injections of hot water and tampons or cocoa-butter suppositories, medicated with opium, belladonna, or phenol, are also available. Mercuric chlorid lotions, Gr. ʒj to ʒj (0.016-0.06 to 30.), are recommended by many writers.

Iodoform, cocain, oleate, and hydrochlorid, the latter in from 2 to 4 per cent. solutions; 1 ounce (30.) of the fluid extract of coca, to 2 or 4 (60.-120.) of water; and linseed oil (especially for pruritus ani), are also recommended. Jullien recommends in pruritus of the vulva:

R—Zinc. oxid.,	ʒvj;	24
Acid. salicylic.,	gr. xv;	1
Glycerin.,	ʒvj;	24
Sig.—Apply as required.		M.

Chéron, in pruritus of the vulva attending the menopause, has successfully used:

R—Veratriæ,	gr. iij;	20
Axung.,	ʒj;	30
		M.

He also administers in pill form $\frac{1}{120}$ grain of veratria rubbed up with licorice. Another useful formula is:

R—Acid. tannic.,	ʒj;	1	33
Alcoholis,			
Glycerin,	āā ʒss;	āā	15
Aq. dest.,	ad ʒiv;	ad	120
Sig.—Apply morning and evening on a rag.			M.

On account of the peculiar predispositions of the sex, anodyne preparations are attended with danger as regards the future habits of the patients and should be used with caution.

¹ Brit. Med. Jour., 1881, i, p. 327.

Surgical treatment of pruritus ani and pruritus vulvæ has been employed, even to complete ablation of the external genitalia.¹ Sir Charles Ball² produces anesthesia of the perianal region by dissecting away the skin in an oval about the anus and replacing the flaps after dissection. In several cases thus treated itching has recurred, and as a rule such measures are not to be recommended. Radiotherapy has proven to be the most valuable of all methods of local treatment. It should be employed cautiously, and a definite dermatitis should not be produced, on account of the subsequent telangiectasia.

In the treatment of pruritis hiemalis, it is essential to see to it that the patient has proper clothing. Cotton should be worn next to the skin, but extra clothing may be worn over this. Corlett advises resorcin as a local application, and believes internal treatment is of no value. Menthol and phenol are the two chief antipruritics employed. Bronson advises bandaging the limbs and smearing them with a 5 per cent. salol, superfatted soap. Owing to the harsh, dry condition of the skin, the following treatment has been successful: In the evening an ointment containing menthol, 1 part; salicylic acid, 1 part; pulvis. amyli. 30 parts; unguentum aquæ rosæ, 30 parts; and unguentum petrolatum to make 100 parts, is applied in thin coating and dusted with talcum powder. Upon rising in the morning, an oily preparation containing 25 parts of glycerin and 75 parts of olive oil may be gently massaged in and also dusted with the powder.

In these cases warm weather is always curative.

Prognosis.—Pruritus senilis is usually an intractable disorder, and when dependent upon senile alteration of the cutaneous tissues is incurable. For all other forms of the disease a prognosis should be formulated with reserve. Under the influence of systematic and appropriate treatment the happiest results are often obtained. Other cases, especially those associated with hypochondriasis, may bid defiance to all medicinal measures. Relapse of the local forms of the malady, especially that of the ano-genital region, is common. In many of these patients the treatment serves merely to palliate.

ERYTHROMELALGIA.³

Definition.—Under this title Weir Mitchell, in 1872, described a chronic disorder in which one or more portions of the surface of the

¹ Illinois Med. Jour., 1905, p. 45 (Howard Kelly's and Borke's method).

² Brit. Med. Jour., January 21, 1905, p. 13.

³ Mitchell, Weir, Phila. Med. Times, 1872, pp. 81 and 113; Amer. Jour. of Med. Sci., July, 1878, p. 17; Clinical Lessons on Nervous Diseases, 1897, p. 177. Graves, quoted by Crocker, p. 715. Mackenzie, Stephen, Brit. Med. Jour., 1879, ii, 704. Morrel-Lavellée, Bull. Soc. franc. de Derm. et Syph., Paris, 1891, ii, 354. Eulenberg, Verhandl. der Berlin med. Gesselshaft., Erster Theil, 1892, p. 239; Neurolog. Centralb., 1893, p. 657. Senator, Berlin klin. Wochenschr., 1892, p. 1127. Lewin and Benda, *ibid.*, 1894, xxxi, pp. 53, 87, 117, and 144 (with references to date). Prentiss, Trans. Soc. Amer. Phys., Philadelphia, 1897, p. 303. Rolleston, Lancet, 1898, p. 783. Mitchell and Spiller, Amer. Jour. Med. Sci., 1899, cxvii, p. 1. Voorhees, Jour. Amer. Med. Assoc., June 1, 1907, xlviii, p. 1837. Barlow, Allbutt and Rolleston's System, 1911, vii, p. 149.

body, particularly over the extremities, became the seat of pain, redness, and local elevation of temperature. Since then Graves, Eulenberg, Senator, Mackenzie, and others have described cases more or less allied to the type originally depicted.

Symptoms.—The symptoms are developed usually in persons of early middle age, in men more often than in women, particularly in those who are engaged in physical labor requiring an erect posture. After a variable period of malaise or suggestions of ill-health, a burning pain occurs in one or more parts of the extremities, made worse by posture and movement, but commonly relieved in the recumbent position. The sensations are those of burning and pain, which recur with exaggeration after prolonged exertion in the erect posture and are soon followed by redness over the fingers, the toes, the heel, or the external or inner face of the foot. One or all digits and one or all members may be involved. The arterial pulsation becomes excessive and the veins distended, with throbbing of the part. The hyperesthesia to heat, cold, and pressure may be excessive; the reflexes are normal or exaggerated; the surface-temperature of the parts affected rises two or three degrees above the normal; the swelling is slight; sometimes there is pitting on pressure. All symptoms are relieved by rest and cool applications.

In some cases the hands as well as the feet are involved, and pains occur in the head, neck, shoulders, elbows, and other parts. In other cases, instead of redness, the parts exhibit a special pallor. Mitchell lays great stress in diagnosis on the color of erythromelalgia—rosy-red, later purplish-red, as distinguished from the livid-red in Raynaud's disease. In some cases vesicles form; in others pinhead-sized nodules; in yet others the subcutaneous tissue is indurated; the finger-ends become tense and shining; or there are clubbing and thickening of the nails. In extreme cases the muscles of the limbs have become somewhat wasted, probably from disuse of the limb.

Etiology and Pathology.—The disorder occurs most frequently in middle life and in the male sex, in those engaged in heavy physical labor in varying temperatures. A few cases have occurred in patients between the ages of sixteen and twenty-one. There are two hypotheses concerning its causation: one connecting the disease with the nervous system, the other connecting it with the vascular system. Hysteria has been noted in association with the disorder, and it has followed certain severe fevers. Traumatism seems to have been effective in a few cases. Galloway¹ concludes that the disease is one dependent upon changes in the blood-vessels, of the nature of an obliterating arteritis. It has been noted to concur with paralysis, Graves' disease, tabes, multiple sclerosis of the cord, alcoholism, osteomalacia, and myelitis. A peripheral neurosis is recorded in a case studied by Mitchell and Spiller. Several instances of its occurrence in association with Raynaud's disease are recorded by Morrel-Lavallée. Lewin

¹ Allbutt and Rolleston's System, 1911, ix, 71.

and Benda conclude that the morbid condition is rather a symptom complex than a malady *sui generis*, the external phenomena being due either to central or peripheral irritation, including either functional or organic change.

Diagnosis.—The striking features of the disease are burning pain, at times intense, associated with swelling and redness, the latter being greatly increased when the part is in a dependent position, and largely relieved when the effect of gravity is removed. The rosy-red and later purplish-red hue of the affected parts differs from the livid-red seen in Raynaud's disease. In the latter condition, early in the disorder the affected part returns to normal; in the former it remains unchanged from the onset. Raynaud's disease, also, occurs at an earlier period of life.

Treatment.—The best results are secured by long rest in the recumbent position; faradization of the nerve-centres; high-frequency currents; cold applications during paroxysms, when required; and a nutritive dietary. Nerve-stretching and nerve-excision have been followed by questionable results.

Prognosis.—The patients exhibiting these symptoms are rarely improved by treatment, the disease often progressing for years with gradual aggravation of the symptoms. The few cases of recovery are important. Excision of a portion of the tract of the nerve and stretching in other cases have been found of questionable value. X-rays were used with improvement in the condition by Sutton and Kanoky.¹

DERMATALGIA.

Synonym.—Neuralgia Cutis.

Definition.—In this morbid state the integument becomes the seat of painful sensations, which may or may not be associated with a hyperesthetic condition. This disorder is much more frequently partial than general, being in the larger number of cases a local expression of some disease of the nervous centres or tracts. It is observed usually in middle life, and in women more than in men. Its symptoms vary in severity from a slight burning to a state of torture that defies description. In character the pain is variously described as comparable to that produced by friction, incision, penetration, contusion, or burning of the integument; as also to the passage over the part of streams of very hot or cold water, or the electric current. With this there is commonly associated an undue sensitiveness to contact with foreign bodies. The skin presents no objective signs of disease. The disordered sensations may be limited to the scalp, the region of the spine, or the palmar and plantar surfaces. In the latter situation it is often significant of some obscurely developed systemic disease, such as syphilis, rheumatism, or locomotor ataxia. In a middle-aged woman a persistent dermatalgia of the interscapular

¹ Jour. Amer. Med. Assoc., December 19, 1908, p. 2157.

region was associated with confirmed gastric dyspepsia (Hyde). In other cases the disorder is dependent upon disturbance of the uterine function. It is occasionally observed as one of the rare signals of the occurrence of the menopause.

It is to be noted that the severe dermatalgia associated with disorders of the uterus in women is occasionally succeeded by a cutaneous lesion. Buck¹ reports dermatalgia of the brows and wrists in a young woman who had frequently miscarried, followed by recurrent formation of a vesicle, which accomplished its career of rupture, crusting, and erosion in a stadium of from five to seven days.

Diagnosis.—The disease is to be differentiated from hyperesthesia of the skin, with which it frequently is associated, and from which it often cannot be distinguished with certainty, as it is not possible always to exclude slight sources of external irritation; and, further, the diagnosis must be based largely upon the observations and statements of the patient. Painful affections of deeper parts, muscular, nervous, aponeurotic, and visceral, must also be excluded. Severe pain limited strictly to the skin of the lumbar region, with hyperesthesia, may precede the occurrence of perinephritic abscess.

Treatment.—The treatment is to be directed to the disorder of which, in the great majority of cases, the dermatalgia is merely a local symptom. Quinin, the salicylates, iron, arsenic, and zinc phosphid are often indicated. Temporary relief, however, may be afforded by the local application of a rubber bag filled with very hot or very cold water; sometimes by an alternation of the two, each for a few moments at a time. Sponging the part with very hot water is also useful, continued for longer periods, and followed by swathing in cotton-wool covered with Lister protective. High-frequency currents over the cord are often of special value. In some cases anodynes may be used topically with advantage, especially cocain, opium, aconite, belladonna, or stramonium in oily combinations. In other cases relief is had by painting the parts with Squibb's mercuric oleate and morphin. The skin should generally, in the intervals of application, be protected by a dusting-powder; and the clothing worn next to the skin should be of an unirritating character.

Causalgia.—Causalgia is a term, chiefly employed by Weir Mitchell, to designate a sensation of burning and pain, with tenderness, occurring in different regions of the integument affected with "glossy skin." The sensitive area in these cases is supplied by the filaments of a single nerve.

Causalgia is distinguished from the pain of neuralgia or sciatica by the localized affection of the skin which is the seat of the abnormal sensation; and from the pains of rheumatism by the absence of the muscular soreness accompanying this last disorder. In the gouty state, with erythematous areas, often shining, over the painful joints, the recognition of any distinction may be attended with difficulty. In pruritus, the itching sensation is invariably the predominant symptom.

¹ Phila. Med. and Surg. Reporter, 1881, p. 677.

Various changes in the cutaneous sensibility have in the past been described as distinct diseases. They are important symptoms in many disorders of the nervous system, a few of them being also of importance in connection with the cutaneous system. The most important of these changes are the following:

Hyperesthesia, which indicates an exaggerated sensitiveness of the skin to external impressions; *hyperalgesia*, which indicates a condition in which the sense of pain is greatly exaggerated, while that of touch is diminished; cutaneous *anesthesia*, a condition in which one or all of the elements of cutaneous sensation are partially or wholly lost, an important symptom in determining the presence or absence of many nervous disorders, and which may be due either to central or peripheral involvement of the nervous system; and *paresthesia*, which denotes a perversion of cutaneous sensibility, as the result of which a given stimulus produces a sensation different from that which it would produce in health.

MERALGIA PARESTHETICA.

Under this title White¹ called special attention to this particular variety of paresthesia, which had been frequently recognized by neurologists, but had been apparently overlooked by dermatologists.

The perverted sensations are limited to the skin on the antero-external surface of the thigh, a region supplied by the external cutaneous nerve, a branch of the obturator. The disorder occurs usually in middle-aged men, but occasionally in women. It has been known to follow trauma, and flat-foot is given as a possible etiological factor. Holmes² states that the symptoms are probably due to compression of the nerve as it passes through the deep fascia when the latter is tense. In a small proportion of cases the condition is bilateral. The symptoms described represent various anomalies of sensation, such as tingling, numbness, coldness, pain of varying degrees, and formication. These are exaggerated on walking or standing, but are usually relieved when the patient is in a recumbent posture. In the major portion of cases, tenderness may be elicited below the anterior superior iliac spine, where the nerve pierces the fascia. In White's case, on the production of artificial hyperemia, the part became congested, the purplish hue receded more slowly than on the opposite side, and on testing with a needle-point the whole area was found to be less responsive than normal, and toward the lower portion, just above the patella, anesthesia was complete.

The disorder has proven intractable to treatment. Rest, massage, and faradism have been recommended. Resection of the nerve has been practised, with relief in some cases but with recurrence in others. Goldenberg³ recorded the relief of a patient upon wearing a metal plate to overcome flat-foot.

¹ Jour. Cut. Dis., 1906, xxiv, p. 160.

² Osler's Modern Medicine, 1910, vii, p. 490.

³ Jour. Cut. Dis., 1906, xxiv, p. 163.

TRICHOTILLOMANIA.¹

This term signifies a condition in which there exists in an individual an uncontrollable desire to pull out the hair. The hairs of the scalp, brow, and beard are the ones usually attacked. It occurs in neurotics, who, however, are otherwise normal.

Hallopeau (quoted by Brocq) has described under the name *trichotillomanie*, and Raymond under the name *tic de l'épilation*, a morbid state characterized by itching sensations of the body, exaggerated in the hairy regions, which leads the patient to seek relief by pulling out the hairs of the affected areas. Brocq states that the disorder consists essentially of an impulse (a true mania), which leads the patient to pull out the hair. He further states that no lesion has been demonstrated either in the hairs or in the affected areas, and that the condition should not be confused with that in which the hairs are rubbed off in areas characterized by itching.

Sutton² describes two typical cases: one in a woman aged twenty-seven, who had the habit of removing the hairs from the eyebrows, and another in a child aged fourteen, who had similarly removed the major portion of the hairs from the left side of the head.

The condition is to be differentiated from diseases associated with alopecia, and its management is directed toward the cure of the deranged mental condition.

Dermatothalasia.—Under this title Fournier³ described a mania which some subjects have of rubbing or scratching certain areas. At times patients are seen who believe themselves infected with insects. This peculiar mental disorder, mention of which was made in the chapter devoted to Pruritus, is termed "acarophobia" by Sutton.⁴ A number of examples have been seen by the author, all presenting similar symptoms in varying degree. The subjects imagine themselves covered more or less extensively with insects or parasites, which they are constantly capturing and destroying. In one family three members were affected, the mother and two children; in another the husband and wife; and several isolated examples have been seen. Various substances, such as collections of epithelial débris, bits of cotton or wool admixed with dirt, and other extraneous matter collected upon the skin, are viewed by these subjects as the active and live cause of their troubles. Any portion of the cutaneous surface may be attacked, and in one patient imaginary insects were removed from the mouth and nose. In some cases intense itching is present, and then the lesions of a traumatic dermatitis occur.

The management of this condition presents a difficult problem, and the prognosis should be guarded. Of seven available records, one patient died in an insane hospital, two recovered, while four when last seen were still suffering with the disorder.

¹ Brocq, *Dermatologie pratique*, ii, p. 398.

² *Jour. Amer. Med. Assoc.*, 1914, lxiii, p. 2126.

³ *Jour. des Mal. Cut. et Syph.*, April, 1898.

⁴ *Loc. cit.* (case report).

CLASS VIII.

PARASITIC AFFECTIONS.

DISEASES DUE TO VEGETABLE PARASITES.

FAVUS.¹

Synonyms.—Honeycomb Ringworm, Porrigo Favosa, Tinea Favosa. Fr., Teigne faveuse; Ger., Erbgrind.

Definition.—Favus is a parasitic affection, usually affecting the scalp, chronic in course, and characterized by yellowish, cup-shaped crusts, having a peculiar "mousy" odor. It is caused usually by *Achorion Schönleini*. It terminates in atrophy or scar-formation.

Symptoms.—Favus affects the scalp chiefly, but it also occurs upon the glabrous portions of the skin and upon the nails. In the former situation it is usually first recognized by the development of minute, subepidermic, yellowish or reddish puncta, visible through the translucent stratum corneum at the site of implantation of the hairs. A circle of delicate vesicles may surround these spots. Puncture with a needle usually gives exit to puriform matter. In the course of a fortnight or more, these lesions cover themselves with pinhead- to pea-sized and somewhat larger, friable, circular, and elevated crusts, having the yellowish tinge of the lemon or of sulphur, and a concavo-convex shape, with the free concave face of the disk exposed. At the centre of the umbilication thus presented to the eye one or several hairs usually make exit to the surface. The inferior surface of this disk or scutulum rests upon the scalp, which is either moist and deprived of its epidermis over a circumscribed area, or is smooth, dry, reddened, and tender. When the crust is removed by traction upon the hairs or otherwise, a minute cup-shaped depression is left at the point where the lowest level of the favus crust was in intimate connection with the epidermis.

The subsequent features of the crusts, the hairs, and the scalp are subject to variation. The crust may acquire a brownish or a greenish tinge by admixture with dirt or with dried pus; may coalesce, or may, by gradual desiccation, exchange the yellowish hue for the dirty-whitish

¹ For bibliography, see Bodin, *La Pratique Dermatologique*, ii, p. 617.

shade of old mortar, a substance which they then resemble in dryness and friability (*Favus squamosus*). The hairs, invaded both in the sheath and shaft, may lose their lustre; become fragile; appear as fractured stumps; be readily extracted from their follicles; and finally be shed, leaving an atrophied hair-follicle. The scalp may first be the seat of an extensive hyperemia or exudation, going on to the formation of pus, when the fungus is a source of acute irritation

FIG. 236



Favus capitis. (From G. H. Fox's Atlas of Skin Diseases.)

in consequence of its active development. Later, when its destructive work may be said to have been accomplished, the scalp-surface is bald, irregularly atrophied, or disfigured with cicatrices, which at first are of a deep-red color, but which gradually fade, while here and there remain tufts of hair that have survived the attack. The lesions may be discrete or be confluent, and may vary in either case. Occasionally, but a few small and ill-developed crusts form upon the surface. The entire scalp is rarely covered with a confluent favus crust.

PLATE XXIX



Copyright, 1900, G. H. Fox.

From G. H. Fox's Atlas of Skin Diseases.

Favus Corporis.

The disease is usually chronic in its course and develops slowly. Untreated, it may undergo spontaneous involution, after total destruction of all hairs and production of general follicular atrophy. but this is rare. It may last for fifteen or twenty years, or even longer. It is often accompanied by adenopathy.

There is usually a moderate degree of itching, as the result of which the favus crusts may be torn and broken by the comb or the nails.

In favus of the body-surface, outside of the scalp, there is often a resemblance to ringworm in the production of circular patches, with an active border made up of vesicles or of papules, which may have a favus scutulum as a centre; or several of these cups may be spread irregularly over circles of scaling patches. In these cases there is often an acuity of symptoms not observed in scalp cases and coincident gastro-intestinal signs of irritation, as vomiting, which Kundrat believes may originate in favus of the mucous surfaces of the esophagus and gastro-intestinal tract.

The lesions may occur on any part of the surface of the face, trunk, and extremities, being found most frequently on the hands, the upper and lower extremities, and the shoulders. It is a striking fact that favus may exist for years in the scalp without spreading to the trunk or elsewhere.

The lesions on the human skin produced by the *Achorion Quinckeanum* ("mouse favus") have been of the erythematous-squamous type, resembling ringworm of the body. The odor of fully developed favus is so characteristic that by it alone a diagnosis has been established. It is usually compared to the odor of mice; also to that of the urine of cats. It should not be confounded with the peculiarly disgusting odor of neglected scalps affected with lice or covered with pustules and filth. The disease not infrequently co-exists with other cutaneous parasitic and non-parasitic diseases, as, for example, with pityriasis of the scalp, or eczema.

Etiology.—Favus is practically always produced by the presence and development of the vegetable organism which is named after its discoverer the *Achorion Schönleini*. Sabouraud¹ states that 99 per cent. of cases are produced by this organism. Two other varieties, the *Achorion Quinckeanum* (Bodin) and the *Achorion gypseum* (Bodin²) are found, but such cases are rare.³ The disease is contagious, and the parasite which produces it is capable of transmission from man to

FIG. 237



Culture of *Achorion* of Schönlein.
(Mewborn.)

¹ Brit. Med. Jour., October 10, 1908, p. 1089.

² Annales, October, 1907, p. 586.

³ Adamson, Brit. Jour. Derm., 1908, xx, p. 365; and *ibid.*, 1911, xxiii, p. 49: Culture of *Achorion Quinckeanum* (mouse favus). (This was the third case of this variety seen.) Sequeira, *ibid.*, 1912, xxiv, p. 31. MacLeod, *ibid.*, 1913, xxv, p. 1380.

man and rarely from animals to man. It shares with other diseases originating from vegetable parasites the peculiarity of attacking certain individuals especially predisposed to such invasion, either by reason of physical peculiarities of organization or because of accidental and fortuitous circumstances. It is most common from infancy to the thirtieth year of life. It is less common in the United States, Austria and England than in France, Scotland and Poland. It is said by Bergeron¹ to be a disease of the country, while trichophytosis capitis prevails in the cities. This statement is corroborated by general experience. Favus is more common in public than in private practice, and the larger number of clinical patients with favus come to the city from the country. Little² recorded favus of the scalp and glabrous skin in a woman the wife of an army officer.

Evidences of contagion are exhibited in those cases in which several members of the same household are affected with the disease. Its contagiousness, however, is not marked. Géber,³ in a study of twelve cases, seven of which appeared to have been contracted from a woman who had suffered with favus of the scalp for twenty years, fixes the incubation period at from six to ten days. Aubert⁴ presents an argument in favor of the production of the disease by traumatism, the resulting wounds becoming by accident the seat of the disease.

Pathology.—The *Achorion Schönleini* may be found in the scutula, the hairs, and the surrounding scales. The fungus is found chiefly between the superficial and deeper layers of the stratum corneum, but it may at times invade the rete and even the corium. The scutulum is constituted chiefly of mycelium, spores, and granular débris. In the centre spores are abundant, while externally there is a dense mycelial mass. The mycelial filaments are directed perpendicularly or toward the periphery of the cup. Surrounding the scutula there is an inflammatory reaction in the skin, evidenced by a leukocytic and plasma-cell infiltration, and beneath the cup there occurs a rarefaction of the connective tissue.⁵ The process results finally in destruction of the normal structures, and scar-formation ensues.

Jackson and McMurtry⁶ describe the development of the scutulum as follows: The parasite, after being deposited upon the skin, proliferates upon and in the horny layer of the epidermis, and upon encountering a hair-follicle the growth proceeds downward in the epithelial sheath toward the bulb of the hair. As the result of this, inflammatory reaction occurs, producing first the pustule and later the characteristic scutulum as above described.

The fungus in the hair-shaft occurs as polymorphic mycelial threads, which lie parallel with the long axis of the hair and terminate near the root in a fringe. The mycelia divide dichotomously at acute

¹ Étude sur la Géographie et la Prophylaxie des Teignes, Paris, 1865.

² Brit. Jour. Derm., 1909, xxi, p. 26.

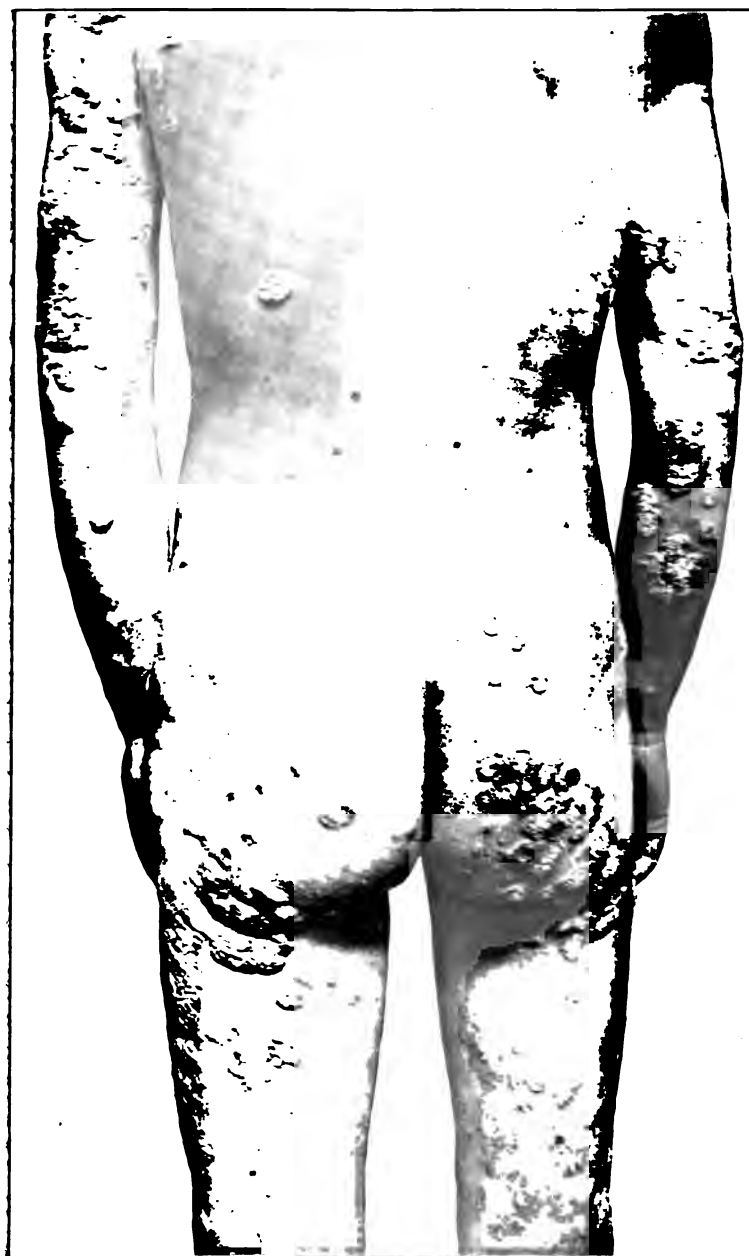
³ Archiv, 1912, cxiv, p. 101.

⁴ Rôle de Traumatism dans l'Étiologie de la Teigne faveuse, Annales, 1881, s. ii, ii, p. 289.

⁵ MacLeod, loc. cit., p. 365.

⁶ Diseases of the Hair, 1912, p. 264.

PLATE XXX



Favus Corporis. (James Dunn.)

Generalized distribution.

angles, the individual threads being 2 to 3 microns or more in width and the joints 4 to 15 microns apart. They contain no spores, but terminate in rows of spores, termed the *Favic tarsus*. The filaments may be replaced by air, which produces a characteristic appearance when the hair is examined in potassium hydroxid.

Diagnosis.—The clinical recognition of favus is based upon the presence of the characteristic yellowish, cup-shaped crusts, which in all typical cases are isolated, each pierced by a hair and each situated in a well-marked depression of the surface of the scalp. In the disseminated form the disks of conglomerated scutella, with defined and frequently festooned edges, friable, yellowish or yellowish-white in color, and greatly differing as to their bulk and contour, are commonly suggestive of the nature of the disorder. In yet other cases the affected area seems to be covered with a plaster-like mass of uneven thickness, irregularly distributed over an enormous patch of disease, which may be practically coextensive with the entire scalp-surface. Incidentally, there may be a history of contagion and a peculiar odor emanating from the scalp. The secondary effects upon the hairs, hair-follicles, and skin are also, when present, significant. In cases of long duration, the atrophy, scar-formation, and permanent baldness are characteristic. White, of Boston, in an essay on the "Vegetable Parasites, and Diseases Caused by their Growth upon Man," calls attention to the stage in which the disease is likely to be mistaken for ringworm. It exists before the formation of the crust, and may be characterized by hyperemia, vesiculation, or papulation, often unnoticed, beneath the hairs of the scalp. In doubtful cases a microscopic examination of the fungus or its cultural characteristics will usually establish the diagnosis.¹

Aubert,² in the absence of the clinical features named above, lays stress upon an intense redness of the scalp where the hairs have been cut and the crusts removed, this color being limited to the portions attacked by the disease. The hairs also, as a result of disintegration of their elements, are infiltrated with air, and look opaque and black by transmitted light; by reflected light they appear polished and stratified, as if constituted of layers of tissue. It should not be forgotten that in exceptional cases favus-crusts coexist upon the body with other diseases of prior or of subsequent origin, as indicated. The disease should not be confounded with seborrhea, pustular eczema, or psoriasis of the scalp, none of which exhibits the special features of a parasitic fungus.

Treatment.—Radiotherapy offers the best method of treatment. Months and years are consumed in its relief without the employment of this method. As the disease produces scars and permanent alopecia, it is well to use any method that will insure prompt relief. The single-

¹ For literature on this subject see Mewborn, *Jour. Cut. Dis.*, 1903, xxi, p. 11 (illustrations and bibliography, and the references tabulated with the introductory paragraphs on Ringworm).

² *Annales*, 1881, s. ii, ii, p. 34.

dose method, as practised by MacKee¹ and others, may be employed, or repeated dosage until epilation is produced.² If radiotherapy is not available, the first indication in the treatment of favus is to cleanse the affected surface from all crusts and scales that may be present. On the scalp the hair should be cut short, after which this area is thoroughly soaked with olive, cod-liver, or other oil, or with glycerin. After this treatment all the crusts are scraped off with a spatula, and the scalp is washed clean with hot water and soap, spirit of green soap being preferably used here. The scalp should then again be anointed with oil or be covered with a soft ointment. Once thoroughly cleansed by repeated soakings with oil and by ablutions, it is necessary to resort either to the topical employment of parasiticides or to epilation. Often both measures are required. Without further treatment the scalp, however completely freed from all evidences of the disease, will not fail to show fresh favus crusts in a fortnight or somewhat longer time.

Epilation is practised with the aid of epilating forceps. These forceps should be constructed with an easy spring that will not tire the fingers of the operator; with blades that are sufficiently broad to grasp a few hairs at once; and with smooth or but slightly serrated faces to the blades, as otherwise the hair is liable to fracture in the grasp of the instrument. The surface to be operated upon should previously be anointed with vaselin or with olive oil, and the hairs entirely removed, a sufficient number, covering a definite space, upon successive days.

The tediousness of this process has led to several devices by which it is sought to do away with its necessity. Originally the "calotte" was employed for the removal of the hairs; it was made by smearing a disk of leather with pitch, and applying it over the scalp. When the calotte was subsequently removed by a brisk twitch with the hand, the hairs which adhered were forcibly uprooted *en masse*; those remaining being adherent in their sacs in consequence of the fact that they had not been invaded by the fungus. As a substitute for this procedure, Bulkley³ employed adhesive masses or sticks, which can be melted and made to adhere at once to large numbers of the hairs. When cold they can be withdrawn from the surface with the hairs attached. These sticks are from two to three inches in length, and from one-fourth to three-fourths of an inch in diameter. The hair is first clipped so as to be about one-eighth of an inch in length. The end of the stick is then heated in an alcohol flame, and quickly placed upon the scalp. It is thus left in place until cold, and is removed by bending it over and drawing upon the hairs successively with slight

¹ Jour. Cut. Dis., 1912, xxx, p. 544.

² Geyser, *ibid.*, 1909, xxvii, p. 321; Howard Fox, *ibid.*, p. 356; Ormsby, *ibid.*, p. 366, and *ibid.*, 1913, xxxi, p. 353; Dally, *ibid.*, 1911, xxix, p. 517, abstr. from Archives of Roentgen Ray, October, 1910.

³ Favus and its Treatment by a New Method of Depilation, Arch. of Derm., 1881, vii, p. 1496.

rotation. When free it is found thickly set with the extracted filaments, which may be burned off in the alcohol flame, thus destroying both the hairs and any adherent fungous masses. The stick is then carefully wiped clean with paper, after which it is again ready for use. The formula for the mass of which these sticks are composed is as follows:

R—Cerae flavæ,	℥ij;	12	M.
Laccæ in tubulis,	℥iv;	16	
Resinæ,	℥vj;	24	
Picis Burgundicæ,	℥xj;	44	
Gummi Dammar,	℥jss;	45	

The parasiticides in greatest favor are: mercuric chlorid in solution in the strength of from 1 to 4 grains (0.066–0.266) to the ounce (30.); formaldehyd (1 to 4 per cent.); sodium hyposulphite in saturated solution; pure or diluted sulphurous acid; spirit of green soap; chrysarobin, pyrogallol, tar, croton-oil; boric and salicylic acids; phenol, petroleum, chloroform, ether, creosote, and oil of cloves. The addition of acetic acid to liquid applications, or washing the surface with vinegar immediately before applying the parasiticide, favors penetration of the remedy. Ointments containing mercury (citrine ointment, yellow sulphate, or white precipitate), naphthol, benzol, thymol, sulphur, pyrogallol, phenol, and salicylic acid are also useful. Chrysarobin is effective in an ointment, though objectionable on account of the staining of the scalp, and almost inevitably of the face also. Lenzberg¹ generates sulphur-fumes in a dish of red-hot coals attached to a frame (made of wood or of pasteboard) close to the head of the patient. By means of a paper cap the fumes are collected and retained (from five to ten minutes) in contact with the patient's hair. During ten years' trial of this plan he has never been compelled to resort to epilation.

One or more of the methods may be needed, either at the same time or by repetition or alteration, until the fungus is entirely destroyed, the requisite period usually extending over three months. Treatment should then be discontinued in order to test the result by observation. If, in the course of a fortnight or more, a relapse occurs, treatment is to be promptly renewed. Upon the non-hairy portions of the body parasiticides thoroughly applied usually insure radical relief.

In general, it may be remarked that patients long affected with rebellious favus may need a roborant course of treatment and nutritious diet. Cleanliness here, as in all the parasitic disorders, is important.

Prognosis.—The prognosis is generally favorable to the ultimate termination of the disease in all cases; for even the most rebellious and untreated forms are relieved when the hair-follicles atrophy. Upon the non-hairy portions of the body the disorder is rarely severe if promptly and efficiently treated. Upon the scalp the prognosis is determined by the extent, severity, and duration of the disease. Early and vigorous treatment of the scalp in healthy children is usually

¹ Der prakt. Arzt., February, 1881.

followed by satisfactory results. In long-neglected subjects of the disorder the result may be remediless, with characteristic baldness, the affected surface being provided with scanty wisps of stunted and uncolored hairs. Neglect, filth, and systemic malnutrition are the most unfavorable elements in any case.

TRICHOPHYTOSIS.

Synonym.—Ringworm.

Definition.—Ringworm is a disease of the hair and hair-follicles of the scalp and beard, and also of the nails and the non-hairy portions of the body, and is produced by a vegetable fungus. Its parasitic nature was discovered by Gruby,¹ in 1842-1844. In 1891, Furthmann and Neebe² advanced the idea that there were two or more fungi responsible for the various manifestations of the disorder. In the following year Sabouraud³ began his researches which have thrown so much light on the subject. As his work has been and is being confirmed in various parts of the world, his classification of the fungi will be adhered to in this text. As the several regions of the body, when invaded by the various parasites, display lesions which are more or less peculiar to themselves, it is usual to consider these separately. Ringworm of the body is therefore designated *Trichophytosis corporis*; of the scalp, *Trichophytosis capitis*; of the beard, *Trichophytosis barbæ*. For purposes of description, the symptoms and diagnosis are given in connection with each variety separately. The etiology, pathology, and treatment are considered as a whole.

Trichophytosis Corporis.—**Synonyms:** *Tinea Circinata*, *Herpes Ton-surans*, Ringworm of the Body. Ger., Scherende Flechte; Fr., *Herpès Circiné*, *Tricophytie*.

Symptoms.—Ringworm of the body displays different symptoms according to the temperature in which the vegetation flourishes and the various external irritants to which the skin where it has once been implanted is subjected.

In general, there are two forms, the dry and the moist. The dry or macular form of the disease is characterized by the occurrence of one or of several pea- to large-coin-sized, circumscribed, reddish circles, usually paling under pressure, often at the general level of the integument, occasionally slightly raised above it, forming then a flattened disk. The centre of the circle may be paler, or, indeed, to the naked eye be unaffected, transforming the patch into an annular lesion, from which circumstance it originally received the name "ringworm." It develops within certain limits, rarely exceeding five or six inches in diameter, by peripheral extension; and is usually characterized at the outer border by slight, whitish, furfuraceous desquamation. This form of lesion is usually seen upon the exposed

¹ Compt. rend. Acad. des Sci., Paris, 1842, xv, p. 512; *ibid.*, 1843, xvii, p. 301; *ibid.*, 1844, xviii, p. 583.

² Monatshefte, 1891, xviii, p. 47.

³ Annales, 1892, iii, s. iii, p. 1061.

surfaces of the body, where there are less heat, moisture, and friction than upon other parts, as, for example, the forehead and neck, in moderate atmospheric temperatures. The disease may recur within the peripheral border, and in this way occasionally two, three, or more concentric rings or parallel bands of crescentic outline may be visible in a single patch of disease. Frequently, a tendency to a peculiar formation, often that of concentric circles, is found in every patch existing at the same time in a given case.

The subjective sensations are a trifling degree of itching or burning.

The moist forms of the disease are represented by vesicular and pustular lesions. The vesicular lesions of ringworm appear as such at the onset, or they may rise from macular lesions. In the former case, pinpoint-sized, transitory, and superficial vesicles or vesicopapules spring from a central point or focus and spread peripherally. The early lesions may speedily shrivel until they are represented merely by minute, whitish, branny scales. These are succeeded by

FIG. 238



Trichophytosis corporis. (From Dr. G. H. Fox's Atlas of Skin Diseases.)

others, always at the periphery, and these again by yet others, the rosy or the reddened base on which they rest being sometimes slightly in advance toward the outlying skin. The enlarging circlets of disease proceed in their course in an evolution similar to that observed in the macular forms. The difference, due to a more virulent fungus, is noted not merely in the type of the lesion, but also in the slightly exaggerated itching sensations that are awakened. Rarely, there may be acute symptoms and extensive development in multiple patches spreading over the face, neck, trunk, and extremities, accompanied by a slight febrile movement and moderate tumefaction of the affected surfaces. As a rule, the eruption is trifling, and may, indeed, be limited to a single ring, or to a few circlets about the neck, terminating in the branny desquamation described; but in the severe forms the evolution of the disease may persist for months, and crusts form, the fall of which leaves annular pigmentation of temporary duration.

The papular and rare pustular forms of the disease observe the same peculiarities with respect to the clearing of the centre, the

annular appearance of the advancing area of involvement, and the production finally of scales and crusts. They represent, however, a more actively developing fungus, to which may be added irritation of the affected part by friction and heat. These lesions are most commonly observed upon the back, the abdomen, the intermammary and inframammary regions, and the inner faces of the thighs and arms, in which localities they occasionally occur with chronic manifestations. The papules are light- or dull-reddish, pinhead-sized and larger, solid elevations, roundish, oval, irregular in outline, or confluent, forming individual bean- to coin-sized, raised disks, with a pale, exfoliating, or actively inflamed centre—the so-called *nummular erythema*, or *discoïd trichophytic erythema* of French authors.

Ringworm not infrequently occurs on the dorsal surfaces of the hands, and in this situation is commonly of a suppurating type, similar to kerion in the scalp; and, according to Sabouraud, these lesions are produced by the *Trichophyton microïdes* of the types *gypseum* and *nibeum*.

Under the title, "Conglomerate or Agminate Folliculitis," Leloir¹ described a disorder, now known to be a variety of ringworm, which occurred in plaques, coin-sized or larger, elevated a quarter of an inch or more above the cutaneous surface, presenting a mammillated appearance, and perforated by numerous follicular openings, from which pus or dried plugs could be expressed. The openings of some of the follicles were covered by unruptured pustules. Later the patch became phlegmonous, fluctuation developed, the follicles became more patulous, and pus in large quantity could be expressed. The appearance at this time strongly suggested that of kerion of the scalp or of a flat carbuncle.² Still another rare form is that first described in 1883 by Majocchi as *Granuloma trichophyticum*. The lesions may occur upon the scalp, the bearded region, or upon the glabrous skin. The parasite invades the structures to a greater depth, making its way into the corium, and producing indolent nodules and plaques. The nodules are hard, and frequently discharge pus, blood, and a yellowish-red fluid. The reaction of the skin to the invasion of the parasite produces a granuloma. In a case recorded by Sequeira³ the disease was of long duration. There were nodules, ulcers, and infiltrated plaques situated in the right axilla, about the umbilicus, and in the left groin. In the latter situation there were numerous flat, button-like nodules, of a purplish-brown color, with a smooth surface. The fungus as grown from scrapings of the epidermis was identified by Sabouraud as *Trichophyton plicatile*. The disease is rare; most of the cases have been observed in the Italian clinics. The above case is the only example recorded in England.

¹ Annales, 1904, s. ii, v, p. 437 (with plates); and Quinquaud and Pallier: "Des péri-folliculites suppurées agminées en placards," Thèse de Paris, 1889.

² Hartzell, Jour. Cut. Dis., 1895, xiii, p. 456; and Schamberg, ibid., 1902, xx, p. 410 (a review of published cases).

³ Brit. Jour. Derm., 1912, xxiv, p. 207.

Ringworm of the glabrous skin is usually produced by one of the chophytons, but in rare instances may be induced by a microsporon, chiefly that designated as *Microsporon lanosum*.

Eczema marginatum, Tinea trichophytina cruris.—Partly because of the controversy which the subject aroused, special attention was once directed to this variant of the disease, which Hebra was first to describe. It is most marked upon those portions of the body which come in contact with the saddle when a rider is mounted upon a horse; that is, the perineum and the inner faces of the thighs, the region marked by the reinforcing patch in the trousers of the cavalryman. The disease, as encountered here, occurs in both sexes. It is characterized by extensive exudation in bright or lurid patches, with a very distinctly defined, raised border, showing a sharp contrast with the healthy skin beyond, from which peculiarity it has its name. It may extend laterally over the groins, upward over the pubes, and backward over the sacrum, being generally defined at the periphery by a crescentic outline. The centre may be paler and less involved, or actively irritated, while the periphery still extends in one or more annular festoons down the inner side of the thigh or upward over the regions indicated. It is aggravated by heat, the moisture of sweat, and the friction of apposed surfaces of the skin in contact with each other and the clothing. It is usually of symmetrical distribution, due to the circumstances of its development, and in this respect differs from the other manifestations of the disease. The condition may occur in milder or even severe forms in the axilla, about the breasts of women, or about the umbilicus. The course of the disease is obstinate, persistent, and subject in a remarkable degree to relapse in the same locality. The disorder is due to a special fungus termed *Epidermophyton inguinale* (Sabouraud), an organism similar to, but not identical with, the trichophyta.

Of much interest in this connection is a condition described as "eczematoid ringworm of the extremities," by Djelaleddin Mouktar, Whitfield, and Sabouraud.¹ The disease was first described, in 1892, by the first-mentioned author, in 1908 by Whitfield, and in 1910 Sabouraud demonstrated the organism to be identical with that which produces eczema marginatum. The lesions in this variety occur, as a rule, on the feet, occasionally on the hands. The symptoms, as outlined by Whitfield, are as follows: The clinical types are divided into three groups: (1) the acute vesico-pustular; (2) the chronic intertriginous, attacking the toes; and (3) the hyperkeratotic of the palms and soles. The first variety is acute. The disorder comes on suddenly, in from 24 to 48 hours, and has all the characteristics of acute vesicular eczema or dysidrosis. In the second type (secondary to a more or less acute attack) there occurs a white, sodden mass of epithelium between the toes, with a more or less well-defined margin and slight vesiculation at the dorsal edge of the entire phalangeal skin. On the plantar

¹ Brit. Jour. Derm., 1911, xxiii, p. 375.

surface the eruption spreads downward beyond the roots of the toes, to terminate in a well-defined, but somewhat irregular, line about opposite the head of the metatarsals. At this free edge the horny layer is in a constant state of desquamation, and the free edge of the scale is, as is always the case in ringworm, definitely turned toward the centre of the eruption. The hands may be similarly affected. Intense itching is present, and occasionally soreness, from the patient rubbing the area. The third, or hyperkeratotic type, attacks the whole of the soles and occasionally the palms. The salient feature is the enormous and irregular massing of the overgrown horny layer. There are here and there small, indolent pustules, some of which only show staphylococci, while others bear the fungus in the roof. The dry type on the palms and soles is usually caused, according to Sabouraud, by the *Trichophyton violaceum* and *Trichophyton acuminatum*. The duration of the disorder is variable, but in most of the intertriginous and hyperkeratotic cases seen by Whitfield the disease had been present for a number of years, the longest period being over twenty years. Sabouraud¹ believes the disease to be common, and states that in the major portion of the so-called cases of intertrigo of the toes the disease is caused by the *Epidermophyton inguinale*.²

Dhobie itch of the tropics is eczema marginatum of other countries, and is due to the *Epidermophyton inguinale*. Castellani³ has isolated three different species of epidermophytons and one trichophyton that give rise to the eruption. In addition to the ones above mentioned, he describes an *Epidermophyton Perneti*, an *Epidermophyton rubrum*, and a *Trichophyton nodoformans*.

The eruption in the tropics is exhibited in greater activity, and frequently involves the axillary regions as well as the groins. Owing to the increased local distress, a dermatitis is added through scratching and friction, which frequently induces secondary infections, such as boils and abscesses. Manson⁴ believes many cases are due to various varieties of the *Microsporon furfur* as well as to the *Microsporon minutissimum*; and it is further thought that the organisms responsible for impetigo contagiosa induce some of the cases classed under this heading. The spread of the disease is attributed to the laundry, giving rise to the name "dhobie (washerman's) itch." Stitt⁵ called attention to fulminating cases of dhobie itch due to a symbiosis of an infecting mould and coccus, such cases being much more virulent than those in which only the mould occurs. In the tropics the term is loosely used to denote practically all itching skin-affections.

¹ Loc. cit.

² Nicolau, *Annales*, 1913, iv, p. 65: A contribution to the study of eczema marginatum of Hebra, reporting among others six cases of interdigital infection by the *Epidermophyton*, in two of which no other sites were involved. Montgomery and Culver, *Jour. Amer. Med. Assoc.*, April 4, 1914, lxii, p. 1076: Report of a case, with description of the parasite and the therapy employed.

³ Castellani and Chalmers, *Manual of Tropical Med.*, 2d ed., 1913, p. 1474.

⁴ *Tropical Diseases*, 4th ed., 1910, p. 770.

⁵ *Jour. Cut. Dis.*, 1908, xxvi, p. 107.

Under the title of *Lichenoid Trichophytosis*¹ (Jadassohn), a number of cases of ringworm infection of the glabrous skin have been reported, which presented symptoms differing from the types above described. The eruption occurred usually in association with kerion, and the lesions were small papules, generally follicular, bright-, bluish- or pale-red in color, and situated chiefly on the trunk and limbs below the knees. Guth described two varieties: one characterized by papules having horny spines, the other by patches resembling psoriasis or seborrheic dermatitis. The disorder occurred only in children, and the fungus found was the *Trichophyton gypseum*.

Diagnosis.—Ringworm of the body is to be distinguished, clinically, from eczema, psoriasis, dermatitis seborrhoica, lupus erythematosus, herpes iris, and syphilis. All the varieties of eczema are noted for their greater degree of itching and infiltration, their much more poorly defined border, coarser scales, decided absence of a circular contour and of a history of contagion. Psoriasis does occur in circular and annular patches, often with a clear centre and with insignificant subjective sensations; but its scales are lustrous and the tissue beneath them readily bleeds, showing deeper implication of the skin. The disease is often symmetrical in disposition; occurs by preference upon certain regions of the body where ringworm is relatively infrequent; and its history is that of a chronic disorder. Dermatitis seborrhoica never presents vesicles nor pustules, and its redness is apt to be less acute, the scales and crusts more greasy and abundant. The subjective sensations are also likely to be less marked, and the disease is apt to be limited to special areas, such as over the sternum or between the shoulders. Lupus erythematosus is often symmetrical, generally chronic, and is characterized by the development of multiple annular patches, enlarging centrifugally from a clearing centre and leaving more or less atrophy. Herpes iris can be distinguished, first, by its predilection for the extremities; second, by the color variegations which it displays and which are never seen in ringworm of the hands. Syphilis is multiform in its lesions, usually preceded by a history of infection; and its distinctly circular patches, enlarging at the periphery, exhibit either atrophy, or ulcerative or distinctly crusted lesions, which suffice for diagnostic purposes. Pityriasis rosea is not characterized by vesicles; is often symmetrical in development; occurs in oval rather than in distinctly circular patches; and exhibits a characteristic tawny-yellowish color not seen in ringworm.

Since the discovery that the disease may occur on the hands and feet as above described, much difficulty in diagnosis is encountered. It can only be suggested that in all cases of intertrigo that are of any duration and do not yield to the ordinary treatment for that disorder, a search should be made for the fungus. A history of a member of the family having suffered with eczema marginatum would be a valuable

¹ Guth, Archiv, 1914, cxviii, p. 856 (a report of 15 cases); Herxheimer and Köster, Zeitschrift, 1914, xxi, p. 570 (case report).

aid in diagnosis. In a number of the reported cases such a history was obtained.

Finally, the microscopical discovery of the parasite is the chief, and, indeed, the essential method of diagnosis in trichophytosis corporis. Whitfield lays stress on a particular technique in examining the vesicular type of ringworm of the feet: The fungus, being ordinarily situated in the roof of the vesicle, is best seen by removing the structure and placing it upon a slide with the deep surface upward. A 10 per cent. solution of potassium hydroxid is then placed on the specimen and after five minutes a cover-slip is applied and the specimen examined with a one-sixth or one-seventh objective.

Trichophytosis Capitis.—**Synonyms:** Tinea Tonsurans, Ringworm of the Scalp, Herpes Tonsurans, Tinea Tondens. Ger., Scherende Flechte; Teigne Tondante.

Ringworm of the scalp is a disease chiefly of childhood, and occurs most frequently among those congregated in public institutions. The gregarious habits of children, and the frequency and intimate character of contacts in their amusements and studies, greatly increase the chances of contagion when one of their number is affected with ringworm of the scalp. In consequence, the early recognition and relief of the disease furnish problems among the most important presented to the general practitioner as well as to the dermatologist.

Symptoms.—The symptoms usually first observed are circumscribed, small-coin-sized, roundish patches upon the scalp, wholly or partially covered with minute, whitish, slate-colored, grayish, or dirty-yellowish scales. Sometimes the formation of the scales can be observed as they develop upon a hyperemic and reddened area. Still more rarely, pinpoint-sized, transitory vesicles or pustules precede. The hairs upon such a patch seem irregularly clipped short near the surface, or, as it is frequently styled, "nibbled" off, thus producing the effect of partial baldness in the involved area. Among them may often be found lustreless, dry, long, and fragile hairs, which break upon slight traction or flexion. The patches may increase in number and spread individually in area until, in the course of weeks or months, the entire scalp is invaded. In the older patches young and downy hairs may here and there be seen pushing up the stumps left by those that have fallen. One or more of the various phases of the disease may be presented in its subsequent evolution. Thus, a single patch may extend to the size of a large coin or of the palm, and the disease be throughout limited to that area. Again, almost the entire scalp may be covered with relatively small or enlarging patches, or, even without the occurrence of any distinct patch, isolated hairs or tufts of hairs here and there over the entire scalp may exhibit evidence of impairment. The disease may be acute or be chronic in its course. Instead of assuming the dry and squamous type described, acute and exudative symptoms may develop, in which event the rare vesicular lesions are succeeded by the exudation of a gummy secretion and the formation of crusts. The condition known as "kerion" is described below.

Itching in various grades of severity, though usually mild, is induced by the disease; and often the patches are altered in appearance by the traumatisms produced by the finger-nails and the comb. When the scalp is very generally invaded by the squamous form of the disorder, its appearance is similar to that noted in diffuse seborrhea, chronic eczema, and psoriasis of the scalp, except that the hairs are less pasted to the surface; are more lustreless, friable, and contorted in shape; and much more often are represented by stubble or stumps.

Stowers,¹ Sangster,² and also Hutchinson, Hillier, Baker, MacLeod and Fraser,³ Little,⁴ and others have recorded cases in which the disease coexisted with alopecia areata. Géber asserts that after exfoliation of patches of ringworm the scalp may, in cases, become absolutely

FIG. 239



Trichophytopsis capitis. (From Dr. G. H. Fox's Atlas of Skin Diseases.)

bald, smooth, and glossy. This condition may exist from the beginning in the *Bald Ringworm* of Liveing, which is often mistaken for alopecia areata, an error readily corrected by the recognition of scaling patches, with hairs exhibiting under the microscope the presence of the fungus.

The *Disseminated Ringworm* of Alder Smith affects isolated hairs or small groups of hairs scattered over the scalp, a broken stump, or a group, or a relatively small number of lustreless, dry, and friable hairs furnishing the only evidence of the disease. Fox⁵ states that the prevailing pattern on the scalp is the formation of slightly scaling macules,

¹ Lancet, 1881, i, p. 326.

³ Brit. Jour. Derm., 1909, xxi, p. 258.

⁴ Ibid., 1909, xxi, p. 271.

² Ibid., 1880, i, p. 425.

⁵ Ibid., 1913, xxv, p. 137.

on which diseased stumps may be found disseminated among some healthy hairs which have escaped infection. The diseased stumps on these macules may be single or in groups of two or three to a dozen or more. In children with long hair the disease often escapes notice. This variety is produced by the *T. endothrix*. Occasionally, patches are formed which resemble those produced by the microsporon. The diseased hairs are described as being more or less pigmented. A striking feature of the diseased stumps is that the extrafollicular portion is so disorganized that it turns upon itself and becomes like a compressed corkscrew beneath the obstructing scales; and when the stump is pigmented the appearance of a black dot is presented. Most of the cases of the disseminated variety are due to the *Megalosporon endothrix* (*Trichophyton crateriforme*). A few, however, are due to microspora.

Ringworm produced by the *Microsporon Audouini* can often be distinguished clinically from that produced by the trichophyton. In the former the patches are single or few in number, are rounded or oval in outline, may be of considerable size, are usually slightly reddened and furfuraceous, and are more or less covered with hairs, which are lustreless, dirty-looking, broken off at irregular distances from the surface, and easily epilated between the thumb and finger in considerable numbers. In this form a grayish or whitish sheath (composed of spores) is seen encircling each hair and extending from 1 to 3 mm. above its exit from the follicle. In the case of ringworm produced by the *T. endothrix*, the patches are much more numerous, but are very small and irregular in outline, and instead of being covered by hairs and broken stumps of hairs usually show a number of black dots at the mouths of the follicles, caused by the curling up of the hair beneath the scales; and instead of forming patches the disease may affect isolated hairs or small groups of hairs.

Tinea Kerion (*Kerion Celsi*).—The occurrence of active and usually circumscribed inflammation in a portion of the scalp affected with ringworm is at times followed by certain peculiar features. This complication of ringworm was recognized early in the history of medicine by Celsus, whose name has since been associated with its lesions. Tilbury Fox, in 1866, was first to recognize its identity with trichophytosis capitis; and it has since been the subject of a number of papers by Tanturri, Majocchi, Schilling, Barduzzi, Auspitz, and Wilson. In the United States, Atkinson¹ has made it the subject of a memoir.

The symptoms are the occurrence of acute inflammation, usually circumscribed, though occasionally diffuse,² in a portion of the scalp, where a tumor forms, which may project to a considerable height above the level. In time the appearance presented is suggestive of a carbuncle, since from the tumid orifices of numerous distended follicles a viscid, semitransparent, puriform fluid exudes. The latter

¹ Archiv. of Derm., 1881, vii, p. 47.

² Wallis, Jour. Cut. Dis., 1905, xxiii, pp. 428, 431. Ten cases with multiple small kerion are described occurring in girls from eight to seventeen years of age.

is characteristic. The hairs loosen and fall. When the view of the lesion is not obscured by the pilary growth, it appears as a flattened, hen's-egg- to turkey's-egg-sized, boggy, semiglobular tumor, its surface congested, reddened, glazed, and often exhibiting other evidences of inflammation, with split pea-sized, pustule-like lesions distributed over its surface, or, when these have ruptured, exhibiting the gaping apertures described above, from which a gummy secretion is poured in varying quantities. Modification of this condition occurs, such as the production of a true subcutaneous abscess with fistulous sinuses. The sensations awakened are usually painful. The course of the disease is chronic. It may begin with the usual symptoms of ringworm of the head, though often there is no history of the latter. The parasite may or may not be found in patches of kerion, according to the acuity of the present or the precedent inflammatory process. If the latter has been of high grade, and suppuration has resulted, the fungus is destroyed, a result the attainment of which has been attempted in the production of "artificial kerion" by means of croton-oil for the relief of trichophytosis capitis. In the earlier stages, represented by deep-seated follicular inflammation, with pustulation of the hair-shafts, the latter may be seen microscopically to be invaded with the fungus.

Diagnosis.—The recognition of a typical patch of ringworm of the scalp is simple. The branny scales, clumps of hairs, and distinct contour of the invaded area are always in the highest degree suggestive symptoms. It has been stated, however, that the general development of ringworm over the scalp produces a condition very like that seen in other diseases. In this case the microscope must be employed for a decision as to the nature of the process. In pityriasis there is a symmetry of involvement which even aggravated cases of ringworm of the head fail to assume; and even though pasted down, atrophied, changed in color, and loosened in their follicles, the hairs are rarely broken off near the scalp in pityriasis of the scalp. In pityriasis, psoriasis, and squamous eczema of the scalp there is, moreover, no history of contagion, and the scales in each disease are different in color and character. The hairs in the two affections last-named are firmly fixed in their follicles, and only in severe cases present nutritional changes. These diseases, moreover, are usually chronic in their course. In any doubtful case, apart from microscopical evidence, thorough removal of all scales from the scalp by shampooing with green soap and hot water will reveal the nature of the disease present.

Alopecia areata, as above noted, may coexist with ringworm, but it is pathologically distinct from it. The patches in the first-named disease are uniformly smooth, and the hair falls from them *en masse*, without scaling or other traces of previous involvement of the regions affected. Blackish points or dots, due to the accidental lodgment of particles of dust, are occasionally seen in alopecia areata, but should cause no confusion, as the other evidences of the so-called "black-dot" ringworm are usually absent.

In favus the cup-shaped crust will sooner or later betray the character of the disease to the naked eye. Confirmatory evidence as to the nature of the disease will often be furnished by a careful search for the source from which it was derived, and for obvious reasons this should always be attempted.

Technique for the Microscopic Examination of Hairs.—To prepare a hair for examination, it may be placed between a slide and cover-glass in a solution of potassium hydroxid. Sabouraud uses a 25 to 40 per cent. solution, which is admirable for rapid work, but which quickly disintegrates the hair. Adamson employs a 5 or 10 per cent. solution, which clears the hair slowly in the course of one or several hours. By making frequent examinations of the specimen, the observer can arrest the destructive action of the solution at any stage desired, and thus better preserve the relative position of the fungus to the hair. Many attempts have been made to stain the fungi, which unfortunately show an affinity for the same stains as does the cortical layer of the hair. A satisfactory method has been devised by Morris and his laboratory assistant, Calhoun. It is a modification of the Gram and Weigert stain for bacilli, and gives good results. The hair is first washed with ether, to remove fatty debris; it is then put for one or two minutes in the Gram-iodin solution, and after drying is stained for from one to five minutes in gentian violet and anilin-water. It is again dried and treated for a minute or two with the iodine solution, and for an equal length of time in anilin oil containing pure iodine, after which it is cleared with anilin oil, washed in xylol, and mounted in Canada balsam. Coarse, dark hairs and spores within the hairs require more time for staining than do fine, light-colored hairs and the fungus elements situated without the hairs.

While microscopical examination will often suffice to distinguish the microsporon from the trichophyton, or even for recognition of some of the varieties of the latter, the finer, and often disputed, points of difference can be appreciated only by means of culture-experiments, for details of which see Pathology and Bacteriology.

Trichophytosis Barbæ.—**Synonyms:** Tinea Sycosis, Hyphogenous Sycosis, Tinea Barbæ, Sycosis Parasitica, Mentagra Parasitica, Ringworm of the Beard, "Barbers' Itch." Ger., Parasitäre Bartfinne; Fr., Trichophytie Sycosique.

Symptoms.—The disease is best studied at its onset in the beard of a blond subject with relatively fine, downy hairs, where are presented the typical features of trichophytosis corporis, or ringworm of the body. One or several, reddish, pea- to small-coin-sized rings become visible, with pinpoint-sized vesicles, branny scales, and often, indeed, no other lesion save a hyperemic, scarcely elevated margin. The hairs over the patch may be fragile, and clusters of them here and there betray evidences of change. With proper treatment the disorder may not progress beyond this point.

In some cases the very slight degree of itching awakened by the process just described may be intensified, and large plaques form, a

portion of which may extend from the region of the beard over the face and neck, or *vice versâ*. When fully developed, a phlegmonous disorder is produced, which bears some analogy to the kerion just described, and which may so actively progress that it is first seen in typical development. The skin is congested and reddened, has sub-epidermic pustules (or débris of those already ruptured) at the orifice of the hair-follicles, and is studded irregularly with firm, pea- to nut-sized papules and tubercles. The tubercles are usually aggregated in masses or lumps, which involve the skin and subcutaneous tissue, and they are firm, often tender and painful, rarely boggy and furuncular. When pierced, they give exit to a characteristic muciform, gluey, yellowish, and sticky fluid, puriform yet differing from pure pus, that rapidly dries into crusts. These composite lesions are usually circumscribed in a given area of involvement, very rarely covering the region of the beard in symmetrical disposition, more often limited to one cheek or to the cheek and chin.

The hairs in the invaded region are involved as in ring-worm of the scalp. These filaments break near the surface of the integument, leaving ragged stumps; or they spontaneously fall after being loosened in their follicles. The ease with which they may be epilated is one of the most characteristic features of the disease; they are slipped out of their follicles as readily as if they had been oiled; or, as Anderson writes, "as easily as a pin can be pulled out of a pin-cushion." They are then often whitish, because enveloped in the fungus producing the disease. In either event, the resulting gradual thinning or removal of the hairs renders the disease of the surface more conspicuous and deforming. At the edge of a patch thus exposed, deformed, lustreless, contorted, flattened, twisted, or split hairs may be found. Occasionally, the features of the patch are changed in consequence of the unusual degree of suppuration excited. In this case the pustules burst and their contents concrete into dry crusts about the stumps of shafts of surviving hairs, from which circumstance the disease has received its name. Rarely, a conglomerate crust covers the entire region, with an excoriated, inflamed, and secreting surface beneath.

FIG. 240



Trichophytosis barbæ. (Mewborn.)

Formidable cases of trichophytosis barbæ have occurred in the persons of farmers, where the disease was long untreated and unrecognized. Some severe types of the disease have been produced after shearing sheep having diseased pelts. In these cases the cheeks, lips and chin are the seat of nut- to fist-sized and larger cutaneous and subcutaneous, soft, boggy, and pus-filled tumors, accompanied by excessive soreness of the entire throat and neck, and the hairs fall from the follicles in large masses, and as if lubricated to facilitate their escape.

The major portion of cases of ringworm of the beard observed in this country are of the suppurative type and due to the ectothrix fungi, which are of animal origin. In London the endothrix fungi,

FIG. 241



Trichophytosis barbæ.

which are of human origin, appear to be responsible most frequently; and, according to Fox, it is the endothrix of the type *violaceum*. Clinically, the lesions have the general characteristics of the other *Endothrix trichophyta*. Small macules with black dots are present. Adamson¹ saw twelve endothrix ringworms of the beard in one year. The symptoms in his cases were described as scaling rings, leading to black dots and curled-up stumps, often becoming inflammatory and producing peculiar inflammatory nodules, but no pustules.

Diagnosis.—Ringworm of the bearded region is to be differentiated chiefly from coccogenous sycosis; and, necessarily, the microscope must be employed to settle the question definitely. The diseases,

¹ Brit. Jour. Derm., 1909, xxi, p. 287.

however, differ in their clinical features. The coccogenous form always fails to exhibit the nodules, tubercles, and composite cutaneous and subcutaneous agglutinations of the disease produced by the fungus. The process in the former is more superficial, and it exhibits a more vivid redness as a result of the cutaneous hyperemia. Owing to the same cause, the frequent pus-containing lesions are developed and elevated above the general level of the integument; they are less commonly subepidermic crypts filled with characteristic mucoid, puriform contents. The region of the bearded upper lip, so often involved in cases of nasal catarrh, is often spared by the trichophyton. When this parasite is present, the hairs are characteristically loosened, distorted, and otherwise changed. This condition is not seen in the coccogenous disease; exception, however, in this particular is to be noted in some long-standing cases of the latter. When the affection has persisted for many years (and one may often see patients thus affected), the thinned and starved condition of the pilary growth is a striking symptom, the scanty, lustreless hairs often scarcely sufficing to conceal the deforming redness and pustulation of the surface from which they spring. The diffuse, symmetrical affection of the hairy face, extending over both cheeks and chin, is more frequently connected with the presence of pus-cocci. Lastly, the hyphogenous, as a rule, is less painful and tender than the other form of sycosis, and, furthermore, is, without question, of rarer occurrence.

With respect to syphilis, it is to be noted that the papular or the pustular syphiloderm developed in the region of the beard is, almost without exception, to be discovered also in other parts of the body, especially the scalp. Ringworm of the scalp and the beard existing at the same time in one individual is rare. In syphilis there is usually an offensive odor to the abundant crusts; shallow ulcers are also prone to form beneath the pustules; and there is often a history of infection or a hint of the nature of the disease in its polymorphic character.

Eczema of the bearded region may extend to or from other portions of the face, as in a case in which it sweeps down from the ear. The presence of a stalactitic crust depending from the lobe of the ear of an affected side would at once furnish a clue to the nature of the disease in the beard. In eczema the interfollicular region is invaded, not deeply as in ringworm, but superficially as in coccogenous sycosis; the itching is severe; the hairs are not involved; the infiltration is diffuse; the outline is indeterminate; and a halo of redness spreads from the affected part to the non-hairy surface in the vicinity.

Etiology. — *Trichophytosis corporis* is caused by the various fungi before mentioned. The disease is more contagious than favus, and hence is much more common. Occurring upon the non-hairy portions of the body, it is often spontaneously removed by the desquamative process which it excites in the skin. The development of the fungus is favored or retarded by external influences. Heat and moisture are important factors, and it is therefore much more severe and rebellious in tropical countries. It occasionally occurs

in epidemic forms. Gerlier¹ gives the details of such an epidemic in Ferney-Voltaire, France, where twenty-six cases of the disease came under his observation. In some of these instances the lesions were pustular, in others tuberculo-pustular. Aggravated forms of the disease often originate in the lower animals, and a severe and rebellious type is frequently derived from the horse. Trichophytosis corporis occurs more frequently in children than in adults, presumably from the relatively tender condition of the epidermis in these subjects. A small epidemic occurring in several members of four families was recently observed by the author. The origin of the disease in this instance was traced to a litter of kittens which had been distributed among these families. A fungus was isolated from these patients and also from the kittens, and these appeared to be identical. The disease is particularly liable to occur in men whose skins are especially moistened, as in those who work in atmospheres saturated with steam. Several members of a single household will often display ringworm of the body at the same time, having transmitted it the one to the other. The need of an appropriate soil for the germination of the fungus is shown by the fact that some individuals are predisposed to its invasion. It is, however, encountered in both sexes and in all social conditions.

Trichophytosis capitis is produced usually by the *Microsporon Audouini*, quite a large per cent., however, being produced by the *T. endothrix* (see paragraph on Pathology and Bacteriology). The disease is observed frequently in children of both sexes, especially in those gathered together in schools and public charities, where it may spread very generally from one to another, and require months and years for its extermination. It is a highly contagious disease, but yet requires unquestionably a suitable soil for its development. Ringworm in the scalp of the adult or aged is indeed among the rarest of cutaneous accidents (Hyde). MacLeod² demonstrated a patient, aged forty-three years, with ringworm in the scalp, due to a microsporon.³ Pernet,⁴ Rothwell,⁵ and others describe adult cases of trichophytosis capitis. Among the methods of transmission is the use of contaminated brushes, combs, wearing apparel, sponges, or towels. The disease is one which prevails rather in the cities than in the country, in which respect it differs from favus.

Trichophytosis barbæ is produced by the trichophyta (see paragraph on Pathology and Bacteriology), usually the ectothrix, less often the endothrix. J. C. White, of Boston, has called attention to the frequency of its appearance in the barber-shop, a fact which common experience verifies. It is usually the irregular visitor to these estab-

¹ Lyon méd., 1881, xxxvi, p. 599, and xxxii, p. 7.

² Brit. Jour. Derm., 1909, xxi, p. 90.

³ Idem, ibid., 1911, xxiii, p. 84 (a small-spored ringworm in the scalp of a woman aged twenty-three).

⁴ Ibid., 1912, xxiv, p. 141 (tinea tonsurans in a woman aged sixty years; fungus, *Megalosporon endothrix*).

⁵ Jour. Cut. Dis., 1914, xxxii, p. 712.

lishments who is first to supply the germs of the disease. No individual proprietorship of cup, soap, brushes, and razor can secure against the danger of infection the person whose razor is drawn over a common strop, whose cheek is handled by unwashed fingers which have recently been passed over an infected face, or whose beard is combed, brushed or rubbed with the implements and towels in common use at these establishments.

It is difficult to determine the frequency of the disease from statistics. The affection is certainly relatively rare, yet more common than is often supposed to be the case. It is of somewhat irregular occurrence, months often passing without a case coming under observation, after which several may be noted in rapid succession.

The disease, being contagious, is one affecting men in all stations of life, and these rather under than over the fortieth year. More men with light hair and eyes, and light-brown, reddish or sandy beards, are affected than those having darker shades of hair and eyes.

Pathology and Bacteriology.—Microscopically, there are two distinct and unrelated forms capable of producing ringworm: *Microsporons*, or small-spored fungi; and *Trichophyttons*, or large-spored fungi. The *Trichophyttons* are divided into two main varieties: *Megalosporon endothrix*, which grows entirely inside of the hair; and *Megalosporon ectothrix*, which grows chiefly on the surface of the hair-shaft. Occasionally, the latter variety appears to penetrate the hair to a certain extent, in which case it is termed *Megalosporon endo-ectothrix*.

The *Megalosporon endothrix* is further subdivided into two varieties: the resistant and the fragile, these names being given to varieties either unaffected or disintegrated, respectively, by the action of potassium hydrate. *Microsporons* are differentiated from *Megalosporons* more by their arrangement than by the size of the individual spores (Morris). There are certain members of the former family which are larger than certain ones of the latter.

From a cultural standpoint, Sabouraud's classification of the ring-worm fungi, as given in his work, "Les Teignes" (Paris, 1910), is as follows:

Microsporons are divided into two groups: first, those of human origin, which include *M. Audouini*, *M. umbonatum*, *M. tardum*, and *M. velveticum*. In Paris, only the first and third of these are important. The second group is of animal origin, and produces in man lesions of the more inflammatory type. Of this group *M. lanosum* (*canis*, Bodin) is the only one of importance in Paris. In addition there belong to this group the *M. felineum*, *M. fulvum*, *M. villosum*, *M. pubiscens*, and *M. tomentosum*.

The *Megalosporons*, or *Trichophyttons*, are divided into two main groups: *endothriches* and *ectothriches*.

The *endothriches* are still further subdivided into, first, the pure *endothrix* type, with the following members: *T. crateriforme*, the most important; *T. acuminatum*, the next in frequency; *T. violaceum*,

the third in frequency. The following of this type are rare in Paris: *T. effractum*, *T. fumatum*, *T. umbilicatum*, *T. regulare*, *T. sulphureum*, *T. polygonium*, *T. exsiccatum*, *T. circumvolutum*, *T. pilosum*, and *T. glabrum*.

The second variety of endothriches Sabouraud terms neo-endothrix. In this variety the organism is of slower growth and does not penetrate the hairs with the same rapidity that the pure endothrix types do. The two members of this group are *T. cerebriforme*, of which quite a number of cases occur in Paris; and *T. plicatile*, which is rare in Paris.

The ectothriches occur in two forms: those with small spores and those with large spores. The small-spored variety, termed the microid type, is still further subdivided into the *gypseum* and *niveum* types.

Members of the ectothrix microid, *gypseum* type, are as follows: *T. asteroides*, with a fair representation in Paris; and *T. radiolatum*, *T. lacticolor*, *T. granulosum*, *T. farinulentum*, and *T. versicolor*. All of the latter members of this group are rare.

The ectothrix microid, *niveum* type, is represented by two members: *T. radians* and *T. denticulatum*.

The megalospora ectothriches are divided into two types: first, those with cultures having a velvet-like surface; and, second, those with cultures resembling the cultures of favus.

The ectothriches megalospora, with cultures of velvet-like surface, are represented by *T. rosaceum*, *T. vinosum*, *T. equinum*, and *T. caninum*.

The ectothriches megalospora, with cultures resembling the cultures of favus, are represented by *T. ochraceum*, *T. album*, and *T. discoides*.

The above outline indicates that only a few of the large number of the organisms occur with any frequency in Paris, and there the microsporons of human origin (*M. Audouini* and *M. tardum*) are most common, the former being in the great majority. Among the microsporons of animal origin, *M. lanosum* is the only one of importance in Paris.

Of the megalospora endothriches, *T. crateriforme*, *T. acuminatum*, and *T. violaceum* are of importance.

Of the megalospora endothriches, neo-endothrix type, *T. cerebriforme* is the important one.

Of the megalospora ectothriches microid, *gypseum* type, *T. asteroides* is the most common one.

Of the megalospora ectothriches megalospora, with velvet-like-surface cultures, *T. rosaceum* is the most important.

Of the megalospora ectothriches megalospora, with cultures resembling the cultures of favus, *T. ochraceum* is the most common.

In London, Colcott Fox,¹ in a study of 639 cases of endothrix trichophytosis, made findings similar to the above. *T. crateriforme* was present in 38 per cent., *T. acuminatum* in 26 per cent., *T. violaceum* in 15 per cent. This agrees with Sabouraud's findings. In addition, he

¹ Brit. Jour. Derm., 1909, xxi, p. 271.

found a primrose-colored culture in 21 per cent. There were also a few that could not be identified.

According to Fox, *T. violaceum* is the common cause of beard ringworm in London. This particular organism induces the black-dot, superficial variety. Nicolau¹ found *T. violaceum* in 38 out of 45 cases of ringworm of the scalp.

Bang,² in a discussion of ringworm found in Denmark, states that *M. Audouini* is rare, but that there was an epidemic in that country in 1906 which affected fifty children. Of the endothrix trichophyta, he describes nine cases produced by *T. violaceum* in the scalps of children between the ages of three and nine. The trichophyton neo-endothrix *plicatile* is the most common in Denmark, according to this author. It produces most of the ringworm of the beard, and occurs in four forms: (1) round, dry, scaling areas; (2) impetiginous lesions; (3) infiltrated, sycosiform, suppurating lesions, often associated with impetiginous ones; and (4) kerion-like plaques. Of 55 cases, 39 affected the beard. Of the ectothrix trichophyta, the common varieties are: *T. gypseum asteroides*, which correspond with Sabouraud's findings; and *T. faviforme discoides*.

The former was found in the scalp, producing kerion lesions and scaly patches. *T. faviforme discoides* was found in cases derived from the horse, and occurred in the scalps of children, once in the beard of a man, and twice in the glabrous skin.

Among the small-spored fungi only two need special mention: *Microsporon Audouini* and *Microsporon lanosum*.

Microsporon Audouini is the more important, and produces the major portion of the cases of ringworm of the scalp. In London it is responsible for from 80 to 97 per cent., according to different observers. Morris³ found it in 92 per cent. in 126 consecutive cases; Fox and Blaxhall⁴ in 80 to 90 per cent. in 400 consecutive cases; and Adamson⁵ in 97 per cent. in 178 cases. In Paris, according to Sabouraud, it causes slightly less than 50 per cent. of the cases. In America, in Boston, White⁶ found this organism in 88 per cent. of the scalp cases; Corlett⁷ in 90 per cent. in Cleveland; Wende⁸ in 89 out of 90 cases in Buffalo. In Scotland, Norman Walker⁹ found it in 18 out of 20 of Jamieson's cases. A similar preponderance of the microsporon in ringworm of the scalp has been noted by us in Chicago. This variety is found fairly commonly in Paris, seldom in Italy, Spain, Denmark, Sweden, Germany, and Austria. Pasini¹⁰ states that in Italy, until recently, only four sporadic cases of small-spore ringworm had been seen, and one of these was not the common microsporon of

¹ Annales, November, 1909, p. 609.

² Verhand. des ersten Nord. dermat. Kongress, p. 9.

³ Ringworm in the Light of Recent Research, London, 1898.

⁴ Brit. Jour. Derm., 1896, xviii, pp. 241, 291, 337, 377.

⁵ Quoted by Morris.

⁶ Jour. Cut. Dis., 1899, xvii, p. 1.

⁷ Jour. Amer. Med. Assoc., March, 18, 1899.

⁸ Cited by Corlett.

⁹ An Introduction to Dermatology, 1899, p. 150.

¹⁰ Atti. della Soc. Milanese di Medic. e Biologia, ii.

London, but that of the dog, and the other three were that of the horse. In 1906, Pasini found three cases of the common English microsporion in Como, and subsequently in an institution in Como, where there were 200 poor children, he found 27 cases. He also found three other children in other parts of the province. In each case he isolated the microsporion of Audouini.

This organism is of human origin and produces the epidemics seen in schools and public institutions. In this type the hair is enveloped by a sheath of closely packed spores, which under the microscope appear in the form of a mosaic. The hair is denuded of its cuticle and eroded, and upon its surface and within its structure are found threads of mycelium running in a longitudinal direction. According to Fox and Blaxhall,¹ branched mycelium occurs first in the epidermis about the mouths of follicles, whence it gradually spreads down into the follicle encircling the hair. In the lower third of the follicle,

FIG. 242



Portion of a hair showing the *Microsporion Audouini*. (From a photomicrograph.)

above the bulb, the cuticle becomes frayed and allows the mycelium to make its way beneath it. The mycelium then spreads upward beneath the cuticle and for a short distance downward, forming a terminal fringe (Adamson's fringe). Immediately beneath the cuticle, it breaks up into short segments, which are arranged in rows or groups, and which, being large and swollen, are known as giant-spores. The latter divide into smaller spores, which coalesce to form the mosaic. The sheath extends upward to just beyond the intrafollicular portion, while the aerial portion of the hair-shaft is eroded and has only a few broken mycelial threads.

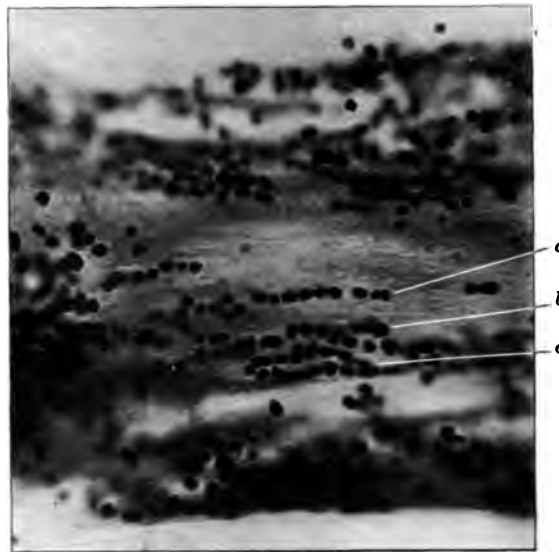
Microsporion lanosum (*canis*, Bodin) is of animal origin, of rapid growth, and produces epidemics in families. This form of ringworm is extremely contagious at all ages. It produces ringworm of the scalp in children and of the body and beard in adults. The organism is found in cats, dogs, and horses.

¹ Loc. cit.

Of the more than thirty species of trichophytons only a few need be more specifically described.

Trichophyton endothrix with resistant mycelium (*T. crateriforme*): This organism produces the yellow, crateriform cultures, and is responsible for the majority of large-spored ringworms of the scalp (*disseminated ringworm* of Alder Smith), some of the beard, a few of the nail, and many of the body ringworms. The mycelia entirely fill the hair-substance and appear as regular, straight, ribbon-like strings running downward parallel to the long axis of the hair and branching dichotomously. The spores are double-contoured and of quadrangular shape,

FIG. 243



Portion of a hair invaded by the trichophyton endo-ectothrix. $\times 500$. *a, a*, chains of spores in focus; *b*, a chain situated farther within the hair, and hence not in focus. (From a photomicrograph.)

and vary from 4 to 6 microns in diameter. At an early stage the spores and mycelia may occur outside of the hair, later entirely within.

Trichophyton endothrix with fragile mycelium (*T. acuminatum*): This organism is characterized by yellow, acuminate cultures, and is clinically indistinguishable from the form described above. It is responsible for a certain number of the black-dot scalp ringworms. Under the microscope the spores are seen like nuts in a bag. When a row of spores is seen it resembles a string of beads, and it is never the ladder-like arrangement of the crateriform spores. Their size is from 4 to 7 microns. The mycelium is fragile and should only be treated with weak solutions of potassium hydroxid.

Trichophyton endothrix (*T. violaceum*) is found commonly in Italy, Roumania, Poland, Algeria, and Argentine. Fox found it in 15 per

FIG. 244



Epidermis invaded by trichophyton: *a*, inferior portion of the stratum corneum; *b*, superior portion of the rete. Both exhibit long mycelial threads, with a few ramifications and a small number of spores. (Kaposi.)

cent. of cases of ringworm of the scalp in London. This variety affects the scalp, beard, glabrous regions, and nails. The lesions produced are

FIG. 245



Hair invaded by the trichophyton.

small black dots, and the organism is more active than the acuminate variety. During the stage of invasion, this trichophyton appears as an endo-ectothrix.

The ectothrix trichophytions, as a rule, are of animal origin, and are productive of markedly inflammatory lesions, resulting in suppura-

FIG. 246



Filaments and spores of the trichophyton from the beard of a patient affected with trichophytosis barbæ.

tion, the disease produced being, however, of much shorter duration than that induced by the endothrix. Epidemics of ringworm induced by the microsporon and endothrix are common; those by the ectothrix

FIG. 247



Culture three weeks old from ringworm of cat, contracted from ringworm of girl's face. (Mewborn.)

FIG. 248



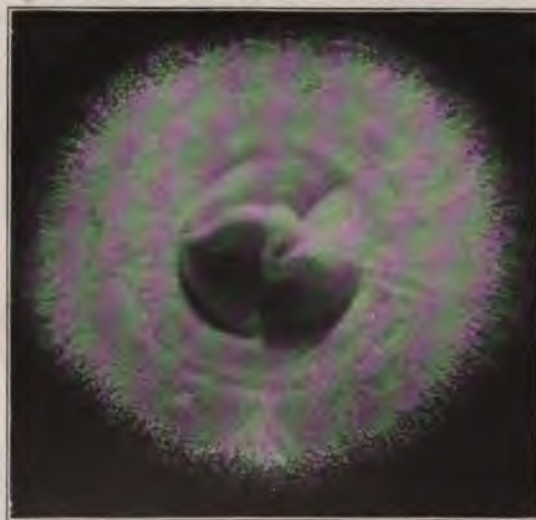
Trichophyton ectothrix culture (rose-pink in color), from a case of trichophytosis barbæ. (Mewborn.)

uncommon. There are two main subdivisions of the ectothrix: a small- and a large-spored variety, or the microid trichophytions and the mega-

spores. The microids produce pyogenic lesions, and are therefore usually the cause of kerion. Their spores are small, usually about the same size as the microsporon, and there is a sheath about the hair. The chains of spores make the differentiation. An example of this group is the *Trichophyton asteroides*. The lesions induced by this organism occur on the hands and wrists of adults, occasionally in the beard, and in the scalps of children. The lesions are kerion-like. It is said that the small-spored kerion is induced by this fungus.

Ectothrix trichophyton megaspore, type *T. rosaceum*: This was found by Sabouraud only eight times—in only 1 per cent. of all his cases. In the beard it produces characteristic lesions. Each hair occupies the summit of a little cone resembling the lesion of keratosis

FIG. 249



Trichophyton ectothrix culture three weeks old, from the case of trichophytosis barbae in Fig. 240. (Mewborn.)

pilaris. The lesions are small and disseminated. The affection outside of the beard is uncommon.

As changes in culture media induce variations in growth of fungi, Sabouraud recommends the use of a common standard, as follows: Water, 3 litres; crude maltose (Chanut), 120 grammes; granulated peptone (Chassaing), 30 grammes; gelose, 54 grammes. In the above, glucose (Chanut) may be substituted for the crude maltose and in the same quantity.

Histology of the Skin when Affected with the Fungus.—The involvement of the skin by the ringworm fungus produces a certain amount of inflammatory reaction, which causes dilatation of the superficial blood-vessels of the corium and a hyperplasia of the thick cellular elements. In certain cases where the fungus penetrates more deeply,

a true granuloma is formed, and in this plasma-cells, multinuclear cells, and other cells characteristic of this condition may be found. Edema and marked dilatation of the vessels may occur, with the accompanying changes which follow this process.

Treatment.—The indications in the treatment of trichophytosis corporis are the removal of the superficial layers of the epidermis, by which means the spores and mycelia are thrown off from the surface; and, if possible, the simultaneous destruction of the latter. Upon the delicate skins of infants and children the simpler remedies are first to be employed. Scrubbing each patch with spirit of green soap, or merely soap and water, will often suffice for its obliteration. The topical application of tincture of iodine is a common and usually an effective remedy. Sabouraud¹ states that tincture of iodine diluted with five times its volume of alcohol gives better results than the pure tincture of iodine. Dilute acetic and boric acids and phenol, or a 1 to 2 per cent. solution of formalin, are available. A solution of acetic acid used with or immediately before other parasitocides is said to favor penetration of the latter. Morris' solution of thymol,² $\frac{1}{2}$ drachm (2.) to 2 drachms (8.) of chloroform and 6 drachms (24.) of olive oil, is equally available. One may also use thymol in ointments, $\frac{1}{2}$ drachm (2.) to the ounce (30.) of simple unguent, with good effect. Of the mercurials, ammoniated mercury, 1 scruple (1.33) to the ounce (30.) of ointment; corrosive sublimate, 1 to 2 grains (0.066–0.133) to the ounce (30.) of solution; and the ointment of mercuric nitrate, 1 drachm (4.) to the ounce (30.) of vaselin, are valuable. Sulphurous acid, from a freshly opened can, and saturated solutions of sodium hyposulphite are as effective as any of the parasitocides, and are often used with advantage as lotions, to be followed by an appropriate unguent, always providing against chemical decomposition of the ingredients of the latter. Sulphur- and tar-containing lotions and unguents are useful in more obstinate cases.

Chrysarobin and pyrogallol, in ointment, from 5 to 10 grains (0.33–0.66) to the ounce (30.), are brilliantly effective in all these cases, subject, however, to the disadvantage incidental to the staining and irritative effects they produce. They should be used with caution upon the skins of children, and always tentatively at the onset. Chrysarobin used in the strength of 1 to 5 per cent. in traumaticin is a valuable application and has the advantage of being retained in the area applied. In cases of ringworm of the face of male adults close to the beard or the scalp, one may employ these remedies to prevent invasion of the hair-follicles by the fungus, the prompt destruction of which may then become a matter of urgency. Wilkinson's ointment, recommended by Kaposi, is also useful in the treatment of aggravated forms of ringworm of the body, but it should be restricted to such forms. For other and more urgent reasons potassium hydroxid

¹ Brit. Med. Jour., October 8, 1908, pp. 1089 and 1094.

² Lancet, 1881, i, pp. 164 and 241.

solutions should be reserved for exceedingly intractable cases. Sometimes a combination of several of the simpler remedies named above may be serviceable, as in the following formulæ:

R—Sulphur præcip.,	℥ijss;	10	
Liniment sapo. mollis,			
Tinct. lavandul.,	āā ℥vj;	āā 24	
Glycerin.,	℥ss;	2	M.
			(Kaposi.)
R—Iodin. pur.,	℥ij;	60	
Ol. picis (sp. gr. 0.853),	℥j;	30	M.
Mix with care, gradually.			
R—Creasoti,	℥xx;	1 33	
Ol. cadini,	f℥ij;	12	
Sulphuris præcip.,	f℥ij;	12	
Potass. bicarb.,	℥j;	4	
Adipis,	℥j;	30	M.
			(Van Harlingen.)

To be used in obstinate ringworm of adults.

R. W. Taylor applies mercuric chlorid, 4 grains to the ounce (0.266-30.) in tincture of myrrh. Perry, of California, uses the bichlorid, in one-half the strength last named, dissolved in sulphuric ether. Foulis, of Edinburgh, recommends iodine dissolved in oil of turpentine or benzine, as these fluids penetrate with greater ease the deeper portions of the skin.

Other articles advised are oleates of mercury and copper, croton oil, glacial acetic acid, cantharidal collodion, petroleum, and pyroligneous acid (Thomas).

The thorough application of the remedy selected for use upon the skin freed from scales by scrubbing with soap and water, is a matter of importance. When a solution of sodium hyposulphite is employed, the previous application of vinegar and water by sponging renders the agent more effective, for evident chemical reasons. Over-treated skins, or those to which too strong a parasiticide has been applied, require subsequent relief of the induced irritation by the simpler bland dressings. The inert dusting-powders, even when not thus indicated, are often useful when there is distinct vesiculation; and in simple cases they may be the sole remedies required, as then the disease is self-limited in duration.

For the eczematoid ringworm of the feet, Whitfield suggests an ointment or oil containing 5 per cent. of benzoic acid to 3 per cent. of salicylic acid, or an ointment of chrysarobin. Sabouraud recommends for the same condition the application of a 1 per cent. solution of iodine and chrysophanic acid. Chrysarobin in the strength of 5 per cent., in either traumaticin or an ointment base, has been uniformly successful in many cases treated by the author involving either or both the hands and feet.

The indication for the relief of trichophytosis capitis is the destruction of the parasite, and there can be no question that this can be accomplished in some cases without having recourse to epilation. Various parasiticides are employed. Prominent among these may be

named formaldehyd (1 to 5 per cent. in aqueous solution), pyroligneous, sulphurous, acetic, salicylic, and boric acids, saturated solutions of sodium hyposulphite, acetum cantharidis, tincture of iodine; Crocker's ointment containing thymol, 1 part to 4 of salve-base; Morris' solution of thymol in chloroform and olive oil; and ointments of boric acid and sulphur, of each 1 drachm (4.) to the ounce (30.) of vaselin; and chrysarobin, the action of the latter being carefully limited to the patch of disease by the aid of a skull-cap.

Epilation, however, is a valuable and often an essential method of treating the disease, and it may be practiced as recommended when considering the treatment of favus. The scalp in each case should first be oiled and then cleansed by the soap shampoo, and after the epilation is performed an appropriate parasiticide should be employed. The calotte, made by spreading pitch-plaster upon leather or muslin, is a clumsy substitute for epilation in order to remove the hairs, but the sticks recommended by Bulkley may be employed, the formula for the preparation of which has already been given. In each case the epilation should remove a zone of sound hairs encircling the diseased patch, that the encroachments of the fungus may in every possible way be limited. It should not be forgotten, however, in the treatment of trichophytosis capitis by both epilation and parasiticides, that in chronic cases these methods in the hands of the most expert have failed for consecutive months to relieve radically the disease; that even the most inveterate cases, in the course of time and as adult years are reached, are relieved spontaneously without permanent alopecia; and that no remedy or procedure is ever justifiable which is capable of either producing follicular atrophy or an effect worse than that wrought by the disease itself.

Jackson recommends an ointment containing a drachm (4.) of iodine crystals to an ounce (30.) of goose-grease. This is rubbed into the scalp twice a day until swelling is produced. An alopecia follows, but the hair returns. Levan¹ applies oil of turpentine on linen twice a day for a week, or until inflammation occurs which produces exfoliation. The subsequent treatment consists in the application of a simple ointment. Hodara² applies daily, after shaving the hair, from 5 to 10 per cent. of chrysarobin in equal parts of glycerin and chloroform. On the production of erythema and edema the treatment is suspended until the irritation has subsided, and then is renewed. Four or five months are necessary for a cure. Sabouraud³ prescribes the following method: The scalp is shaved and the hair epilated from the diseased area and from a zone 4 or 5 mm. wide surrounding it. Every second evening the entire scalp is rubbed thoroughly with 60 per cent. alcohol containing 25 per cent. of pure iodine. Beginning areas of the disease not visible to the naked eye are stained by the iodine and can be recognized easily. On alternate evenings an ointment containing pyrogallie acid, 15 grains (1.); oil of cade, 1 drachm (4.); and vaselin, 5 drachms

¹ Jour. Mal. Cut., 1901, xiii, p. 241.

² Monatshefte, 1903, xxxvii, p. 118.

³ La Pratique Dermatologique, iv, p. 508.

(20.) is applied. The scalp is washed each morning with soap and hot water. If this treatment fails to produce a follicular inflammation, croton oil is added to the ointment.

Coster's paste is popular among English practitioners, including Stowers, Fox, Liveing, and others. It contains 2 drachms (S.) of iodine in crystals, dissolved in 1 ounce (30.) of oil of tar; and is painted over the part at intervals of a few days. It is most useful in circumscribed patches of the disease. Williams¹ recommends the following formula: picric acid, 7 grains; camphor, 4 ounces; alcohol, 4 ounces; to be applied all over the scalp twice daily.

Among other remedies suggested for use on the scalp may be named mercuric chlorid, ammonio-chlorid, red oxid, oleate, and ointment of mercuric nitrate; pure phenol and carbolated glycerin; sulphur, chloroform, ether, tar in ointment, and Wilkinson's salve.

To be effectual, the treatment must be persistent and thorough, and always be accompanied by frequent washings and soapings of the affected part.

The induction of suppuration in the hair-follicles (or a species of artificial kerion), by the aid of electrolysis and croton-oil liniment has been praised by Alder Smith and Wyndham Cottle, of London, and later, in a modified form, by Magee Finny, of Dublin. By the process of Finny, 100 parts of the oil are mixed with 50 each of cocoa-butter and white wax. Sticks are made of this compound, which can be rubbed thoroughly into the part affected. By both methods it is claimed that no pain is produced, nor is permanent alopecia the result. A solution of salicylic acid is applied after each treatment, and a subsequent poultice may also be needed. In these cases the parasite is destroyed presumably by the suppuration excited. As in the case of ringworm of the body, trichophytosis capitis is not remediable by internal treatment. Such internal medication, however, may be indicated by the systemic condition of young patients, and should be in each instance such as the condition suggests.

The treatment of kerion is either by the milder parasiticides or by the methods proper for the relief of ordinary phlegmonous inflammation of the scalp, according to the stage of the kerion. The paracocci present in some of these cases require boric-acid lotions and bichlorid washes.

When properly controlled, the treatment by means of x-rays gives best results. Sabouraud² revolutionized the ringworm situation in Paris when he introduced his method of treatment of the disease with x-rays. The method of Kienboch-Adamson³ is also largely used. By this method a single exposure is given, which causes epilation of all the hairs, and with them the fungus, with consequent relief of the disorder. About two weeks after the exposure the hair falls, and, a - a

¹ Brit. Jour. Derm., 1912, xxiv, p. 216.

² Ibid., 1906, xviii, p. 199 (A complete discussion of the subject, with interesting details as to technique and apparatus and results of treatment).

³ Lancet, May 15, 1909.

rule, within two months begins to regrow. The dosage is measured by Sabouraud's pastille, and other measures are taken to prevent undue exposure. In many thousands of patients treated very few cases of permanent alopecia have resulted. The treatment, however, should not be used except by an experienced operator, and cannot be recommended for general use.

The treatment of trichophytosis barbæ is conducted generally as in trichophytosis capitis. It is customary to begin by anointing the affected surface with an oily or fatty substance, and to follow this with a shampoo of soap and warm water for the removal of crusts, after which shaving and epilation are practised on alternate days, and parasitocides employed locally. For softening the crusts the spray of an atomizer may be used.

Epilation of the male beard is often essential for removal of the disease, but the results of the treatment suggested below may be satisfactory.

The patient for two successive days keeps the affected part macerated with almond or olive oil. On the evening of the third day the shampoo with soap is employed, and the skin is washed free from crusts and scales. The part is then cleanly shaved. This operation is at first painful, but gradually becomes less distressing. After shaving, the affected surface is bathed for ten minutes with borated water as hot as can be tolerated, by which means the inflammatory condition of the perifollicular tissues is, in a brief time, considerably reduced. While the bathing is in progress all subepidermic pustules or points where a mucoid fluid is coming to the surface are opened with a fine, aseptic needle. A solution of sodium hyposulphite is then sponged freely over the affected surface for several minutes and allowed to dry. This solution may contain 1 drachm (4.) to the ounce (30.), or even more. After a thorough and final washing with hot water, the tender skin is carefully dried and gently smeared with a sulphur ointment containing 1 to 2 drachms of sulphur (4.-8.) to the ounce (30.) of vaselin, often with the addition of from $\frac{1}{4}$ to $\frac{1}{2}$ (0.016-0.033) grain of mercuric sulphid. The patient then retires to bed. In the morning the unguent is washed off with soap and water, the sodium solution is reapplied, and a borated or a salicylated powder is thoroughly dusted over the part and kept on during the day. In the evening the shaving may be repeated or not, according to the vigor with which the beard is reproduced, but on the second day shaving is imperative. As soon as the pustulation ceases and the tubercles have manifestly diminished in size, the ointment at night is superseded by the use at that time of the dusting-powder. Whether the shaving is practised nightly or on alternate nights, ablution with very hot water and with a solution of sodium hyposulphite is continued nightly until the inflammation excited by the fungus is practically limited to the follicles that are invaded. The dusting-powder is to be thoroughly and constantly employed after the ointment is discontinued. In many cases good results may be obtained by following the above technique,

but substituting a 1 to 2000 solution of mercuric chlorid for the boric acid bath and sodium hyposulphite solution, after which an ointment is applied containing $\frac{1}{2}$ to 1 drachm (2.-4.) of hydrargyrum ammoniatum to the ounce (30.) of adeps in place of the sulphur ointment. With care and patience these measures may save many patients the annoyance of epilation; and they should be continued for several weeks after apparent relief of the disease.

The treatment may be varied to suit the needs of individual cases. Kaposi highly recommends, for example, 1 per cent. solutions of mercuric chlorid locally; and the other parasiticides considered heretofore in connection with the treatment of ringworm may also serve a good purpose. In some cases an ointment of thymol may be used with manifest advantage; in others, a substitute may be found in Morris' solution of the same in chloroform and oil (the formula for this has already been given). In still other cases spirit of green soap with sulphur, finely powdered sulphur, boric and acetic acids and phenol, or other topical applications of recognized value may be employed.

When resort is had to epilation (and this is essential in all severe cases), the hairs should be thoroughly removed from their follicles over every lumpy nodule, and even over every suggestive patch covered with scales. A zone should be cleared about each such papule. The results are prompt and in the highest degree satisfactory. Radiotherapy used in moderation, just sufficient to produce epilation, is a valuable addition to other methods.

Precautions to be Observed in the General Management of Tinea Favosa and Trichophytosis.¹—The physician consulted in the case of a patient affected with either of the diseases thus far considered as resulting from the presence of a vegetable parasite should bear in mind that they are the most contagious of their class. He may not only suffer himself from the disease which he is attempting to relieve in another, but may also convey it to others, or be consulted by others of his patient's family actually infected during the course of the treatment pursued.

It is essential that the hands of the physician should be carefully washed after each manipulation of the part, and preferably with a weak disinfecting solution. In the case of children the lining of all caps, hoods, and other coverings of the head should be removed and destroyed by burning, and fresh linings, made of tissue-paper, renewed daily; while caps of the same or of similar material should be worn when indoors. Brushes, combs, towels, and articles of clothing should never be used in common by two or more individuals. When practicable, infected individuals should occupy separate beds; and the bed-covering, clothing, toilet-apparatus, and dressing or other materials which have been in contact with a diseased surface should be immersed in boiling water before they are again employed for any use in common. Thin recommends covering every diseased patch.

¹ Corlett, Jour. Cut. Dis., 1900, xviii, pp. 315 and 360.

after the treatment appropriate to itself, with an adhesive and impermeable dressing, for the sake, not of the patient, but of those with whom the latter may be brought in contact; and the suggestion is both wise and practicable. A man who has been infected with ringworm of the beard in a barber-shop which he has visited but once will often, when directed by his physician to shave, resort to some other establishment where he has more confidence in the cleanliness of the operators. In this way he often thoughtlessly spreads the disease of which he is the victim. It is well to send patients who cannot shave themselves to a particular barber, who has been instructed in the manner of shaving so as to insure immunity.

Tinea Imbricata.—**Synonyms:** Tokelau Ringworm; Burmese, Chinese, or India Ringworm; Bowditch-Island or Scaly Ringworm; Lafa Tokelau, Pita, Cascadœ, Gune, Herpes Desquamans, Tinea Circinata Tropica, Gogo. Fr., Herpès Tonsurans Desquamatif.

This disorder was portrayed first by Alibert in 1832, and described first in 1844 by Fox, and has since been studied by Turner,¹ Manson,² MacGregor,³ Königer,⁴ Roux, and Castellani.⁵

Symptoms.—The eruption may appear in the form of patches made up of concentric rings, or be diffuse, resembling in the latter case ichthyosis. The scales in both cases are identical. After artificial inoculation, the disease first appears as a series of semicircles, made up of minute reddish points, which soon develop into papules, accompanied by intense itching. The growth thenceforward is reported to be at the rate of from 5 to 10 mm. each week. In a brief time, lamellæ of epidermis are detached, their free border being directed to the centre of the circular disk, the patch or patches when fully developed being represented by concentric rings, about 5 mm. broad, suggesting a resemblance to watered silk. The scales may be as large square as half a centimeter, with curling edges, which later become horny and much darker in color. It is said that the hand passed over such patches from the circumference to the centre recognizes a smoothness of the surface; but when the motion is reversed, from the centre to the periphery, the scales are raised and resist the fingers. The appearance of the older patches suggests a skin covered with clay. The process of production of the concentric rings is reported to be, first, the elevation of a central point of epidermis and the formation there by the fungus of a brownish mass; then the separation of the epidermis at the central point, with persistence for a time of attachments at the border; next, the liberation of the attached edge by friction or otherwise; and, finally, the exposure of the corium. Just beyond this line, a brownish rim declares the line of advance of the fungus beneath the epidermis. When the ring thus formed has attained the diameter of

¹ Glasgow Med. Jour., 1870, p. 502.

² Tropical Diseases, p. 628; China Imp. Merit. Cut. Med. Rep., 1879, xvi, p. 1; Med. Times and Gazette, 1879, ii, p. 342.

³ Glasgow Med. Jour., 1876, p. 343.

⁴ Virchow's Archiv, 1878, lxxii, p. 413.

⁵ Brit. Jour. Derm., 1913, xxv, pp. 377-401.

about 5 mm., a brown point again appears centrally, and there is a repetition of the process originally observed in the primary ring.

All portions of the body and large areas of the general surface may be affected. According to most observers, the scalp, face, palms and soles, axillæ, and nails usually escape, but Castellani has often observed the eruption in these situations. He states further that the nails may be affected and become much thickened, presenting a rough surface and deep fissures, scrapings from which show the causative fungus. The hair-follicles, according to all authorities, are spared, though the hairs are said to fall when the glabrous skin of the hairy region is involved. When the disease spontaneously disappears from any portion of the integument, there are left persistent, deep-colored rings or circles where the scaling originally occurred. The itching is commonly marked. A somewhat characteristic piebald appearance is produced in places where the scales have been removed and the resulting pigmentation is partial. The scaling is most marked in parts contiguous to healthy skin. The disease is chronic, as a rule.

Etiology.—*Tinea imbricata* is a contagious disorder affecting persons of both sexes and all ages, and is produced by a vegetable parasite. The disease in certain localities is endemic. It has been produced a number of times by experimental transmission from a diseased to a healthy skin.

Pathology.—Much confusion has existed relative to the causative organism, although all authorities have agreed that it is some sort of a vegetable parasite. Sabouraud and Nieuwenhuis believe it to be a variety of the large-spored trichophyton. Tribondeau reports that it is not a trichophyton, but an aspergillus, termed by him *Lepidophyton*. In Castellani's recent work, he reports that he has succeeded in growing the fungus and reproducing the disease by inoculating pure cultures of this fungus. To identify the organism, he has created a new genus, *Endodermophyton*. Two species have been separated, one of which he terms *concentricum*, the other *indicum*. He states further that the fungi belonging to this genus are characterized by their growth between the superficial and deep strata of the epidermis, forming an interlacing belt of mycelia, which detaches the horny and granular layers from the rete Malpighii. Botanically, they are closely allied to the achorions. Microscopically, the fungus presents interlacing mycelial tubes. The segments are rather regular in shape, somewhat square, and usually straight. Fresh preparations from young cultures show abundant septate mycelia. Reproduction, apparently, is by sprouting, branching taking place. No spore-bearing hyphæ are present.

Diagnosis.—The disease is to be differentiated from ringworm, which is readily done by the complete absence of all signs of inflammation; and by the large, flaky, firmly attached scales, and the peculiar concentric circles. In ichthyosis, a microscopic examination readily settles the question.

Treatment.—The scales are to be removed with soap and water or by alcohol baths, after which various medicaments may be rubbed

in. Manson recommends strong linimentum iodi. Castellani endorses this recommendation and advises also resorcin 8 in tincture of ben-zoin 30; or chrysarobin in ointment in a strength of 5 to 10 per cent. Many other remedies have been employed with varying results.

Prognosis.—The prognosis is favorable.

TINEA VERSICOLOR.

Synonyms.—Pityriasis Versicolor, Dermatomycosis Furfuracea, Mycosis Microsporina, Chromophytosis. Ger., Kleinflechte.

Symptoms.—The eruption in this disorder occurs in the form of few or of many, irregular, roundish, circumscribed, or reticulated macules, pinhead- to small-coin-sized, rarely occupying an area the size of the palm or larger. In color it varies from the most delicate buff or fawn shade to a reddish, deep-brown, or even blackish hue. The surface of each lesion, when closely inspected, is usually seen to be covered with furfuraceous scales. If the scales are not visible, slight erosion with the finger-nail or the curette will demonstrate the fact that the superficial layers of the stratum corneum are, in the site of each lesion, readily separable from the tissues beneath. The eruption is most common upon the anterior surface of the thorax; but it is displayed also upon the neck, the dorsum, the abdomen, the other regions of the trunk, and the flexor aspects of the upper extremities (the hands only excepted). It rarely is seen upon the lower extremities; still more rarely on the face and on the hands and feet.¹ The eruption is either unproductive of sensation or is accompanied by mild itching. Patients usually declare that after profuse sweating, bathing in warm water, or brisk friction of the surface, minute epidermal rolls separate from the affected area. The disease may linger for years upon the surface of the body. It has a special tendency in susceptible individuals to recur after removal.

The eruption is occasionally encountered in extreme development. In a young married woman who had been the subject of the disease for many years, the entire trunk, the axillæ, the groins, the upper portion of the thighs, the neck up to the level of the high collar worn, and the upper extremities down to the wrists, were encased in a uniform sheet of chocolate-tinted epidermis in a condition of exfoliation in finger-nail-sized, lamellated flakes. Even in these extreme cases the tendency of the disease to avoid surfaces exposed to the light is distinctly manifested. Unna² describes an anomalous feature of the disease, in which the maculations occur in annular form with a clearing centre. McEwen³ recorded a case exhibiting follicular papules in addition to the ordinary lesions of the disorder. Rarely, also, a very few irregularly distributed macules may be seen as the

¹ E. O. Smith, New York Med. Jour., 1896, lxiv, p. 583, reports a case in which the disease was limited to both soles; and Gottheil, New York Med. Rec., 1899, lvi, p. 15, a case in which the left palm was involved.

² Vierteljahr., 1880, xii, p. 165.

³ Jour. Cut. Dis., 1911, xxix, p. 19.

sole evidence of the existence of the parasite. Thus, a patient may exhibit a small-coin-sized patch on the surface of the chest, another on the shoulder, and possibly a third over the deltoid region of one arm. These are generally cases partially relieved of a more diffuse eruption. More commonly, the slightest manifestation of the malady is an irregular, vertically arranged, somewhat narrow band of lesions imme-

FIG. 250



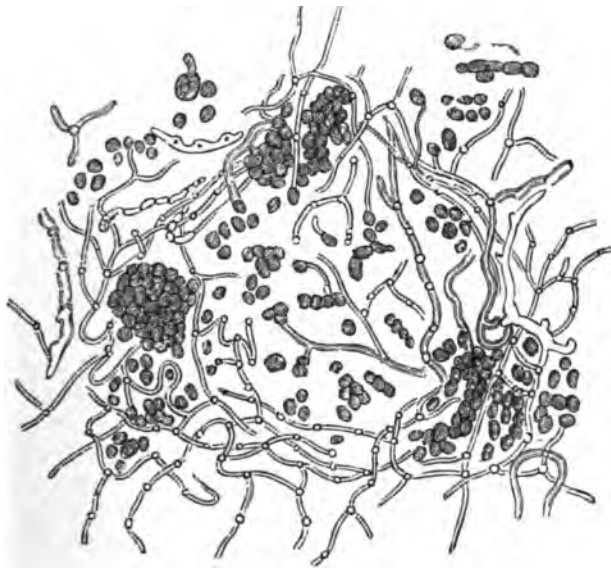
Chromophytosis guttata. (From Dr. G. H. Fox's Atlas of Skin Diseases.)

diately over the sternum, and visible beneath the hairs of that region in the adult male, or upon the intermammary sulcus of women. The face, hands, palms, soles, hairs, hair-follicles, and nails are usually exempt.

Etiology.—The disease is produced by a vegetable mould, discovered in 1846 by Eichstedt, to which Robin gave the name *Micro-*

sporon furfur. Its transmissibility is far inferior to that of the vegetable parasites already described, and it illustrates well a point to which attention already has been directed, viz., that these fungi flourish only in soils suitable for their germination and fructification. Members of one family are said to communicate the disease occasionally the one to the other; and Lancereaux¹ reports that in this way he accidentally infected himself from scales collected for examination from a patient in hospital, and afterward unwittingly transmitted the affection to his wife. The disease occurs in both sexes, rarely before puberty or after middle life, and in persons of every social condition, irrespective of personal cleanliness. It is exceedingly common, more so, indeed, than statistics are capable of demonstrating, inasmuch as

FIG. 251



Microsporon furfur. (After Kaposi.)

hundreds who are annually annoyed by it never seek professional advice. In physical examinations of men for military service, as also of government pensioners, the disease is often recognized upon the persons of those who pay no attention to its presence. Being concealed by the clothing and unproductive of much discomfort, many subjects of tinea versicolor endure its presence with unconcern.

By some it has been supposed that the fungus selects the chest of the phthisical as its habitat, a supposition doubtless based upon the fact that tuberculous men and women, more than all others, expose the chest to the view of medical men in order to permit of its auscultation and percussion.

¹ Traité d'Anatomic pathol., p. 265; Paris, 1875.

Pathology.—The *Microsporon furfur* (Fig. 251) is readily recognized with the aid of the microscope, as it exists in luxuriant profusion upon every affected surface. The scales may be scraped from the skin, placed on a slide moistened with a 1 to 10 per cent. solution of potassium hydroxid, and be examined at once, when innumerable clustered spores and short threads become visible; the former highly refractive and resembling in their circular and oval contours droplets of oil. Their aggregation in clusters is distinctive among the other forms of cryptogamic vegetation. They measure 0.0023 to 0.0084 mm., while the hyphæ vary in diameter from 0.0015 to 0.0038 mm. (Duhring). Among the latter, sporophores are distinguishable, with contained conidia and terminal elements emerging at one extremity or the other of the spore-case. Both elements are stained more readily by eosin and methyl-violet than those of the trichophyton or of favus. By the use of special media, Matzenauer¹ and Gastou and Nicolau² have succeeded in cultivating the fungus.

One of the strongest arguments against the claim for the identity of all the vegetable parasites is furnished by the history of this interesting mould. It never by any possibility invades the hairs, and rarely the hair-follicles, though it may be seen flourishing at the orifice of a follicular duct, and even beneath a vigorous hairy growth upon the chest of a male subject. It avoids light and air, and singularly refuses to encroach even upon certain covered portions of the body, preferring, for instance, in its extreme development, to linger unobtrusively at the neck, near the verge of the collar.

Diagnosis.—In this disease, as in all parasitic affections of vegetable origin, the microscope may be required to decide the diagnosis. In its simpler manifestations the recognition of the affection is readily assured. The location of the eruption, its irregular reticulations, its characteristic yellowish or fawn-tinted color, due to the nature of the fungus, and the exfoliation of the epidermis which it excites by its superficial penetration of the outer layer of the stratum corneum, producing thus a mealy, branny, flaky, or roll-like exuvium, are all significant. None of the chloasmata due to pigment-changes in the skin, however much they may resemble tinea versicolor in color, shares with it this peculiarity of desquamation. Chloasma may involve, moreover, the face; tinea versicolor almost never. Vitiligo commonly occurs on the forehead, face, and dorsum of the hands; tinea versicolor very rarely. The macular syphiloderm may be mistaken for the disease under consideration, but, when developed to such an extent as to rival tinea versicolor in its diffuseness, the syphiloderm will creep out over the face, the hands, and the feet, and will be accompanied by adenopathy, alopecia, mucous patches, palatine hyperemia, or will furnish evidence of a polymorphic tendency. Often, indeed, with such an eruption, the survival of the initial sclerosis will at once betray the nature of the disease. These are important considerations, since in

¹ Archiv, 1901, lvi, p. 163.

² Bull. de la Soc. franc. de Derm., 1902.

the mere matter of subjective sensation, color, shape, and size of lesion there may be marked resemblance between the two disorders. Patients exhibiting the lesions of tinea versicolor may suffer from syphilis; and many having the former disease believe, in consequence of a suspicious exposure, that they are infected with lues, and yet, indeed, are not. These incidents serve to illustrate the importance of making an accurate diagnosis in every case of cutaneous disease.

The most common error committed in this connection, however, is based upon the fancied resemblance in color between the patches of tinea versicolor and either the liver itself or the color-changes which disease of that organ is capable of producing in the skin. Hence, the existence of "liver-colored" spots in the skin is erroneously attributed to hepatic disease. Few patients consult physicians for relief of this disorder who have not a belief in the internal origin of the disease.

Treatment.—A single method of relieving tinea versicolor is recommended, for the simple reason that it invariably is successful. It requires merely vigorous and intelligent coöperation on the part of the patient. A hot bath is taken, if possible, for three nights in succession, and when the surface is well macerated in hot water the affected skin is scrubbed either with the cheap yellow soap of the shops, or with *sapo mollis* in substance or in tincture. When the disease is extensively developed, this process is aided by friction with a flesh-brush or with a coarse towel. The skin is then washed clean with a surplus of hot water and dried, after which the affected patch is first moistened with vinegar and water, or dilute acetic acid, and afterward well sponged with a solution of sodium hyposulphite, 1 drachm (4.) to the ounce (30.) being usually sufficient. As a rule, the greater part of the eruption is removed with the third application. If there be recrudescence in isolated patches, as is often the case, or outlying areas which have withstood the parasiticide employed, they should subsequently be attacked with a solution of mercuric chlorid, 1 to 2 grains (0.066–0.133) to the ounce (30.). Other measures, however, are popular with physicians, and among them may be named the topical use of boric or sulphurous acid, phenol, and tincture of iodine; sulphur in bath, ointment, or lotion; calomel in ointment; the alkalies in bath or lotion; potassium sulphid in bath; chrysarobin, pyrogallol, tar, Wilkinson's salve, and the other parasiticides employed in the treatment of ringworm of the body. Leven¹ secures an exfoliation of the skin and a removal of the disease by the embrocation of oil of turpentine four or five nights in succession. Whatever parasiticide be employed, after treatment the inner clothing should not be worn until it has been immersed in boiling water.

The following formula is also recommended:

R—Hydrarg. chlorid. corros.,	℥j;	1	33
Saponis mollis,	℥ij;	60	
Alcoholis,	℥iv;	120	
Ol. lavandul.,	f℥j;	4	M.
			(Anderson.)

¹ Monatshefte, 1901, xxxii, p. 197.

Prognosis.—The disease can readily be relieved by simple treatment. Relapses often occur, and require to be radically treated. Untreated, the disease may continue for years without the slightest impairment of the general health. It is probable that when untreated the parasite undergoes spontaneous exfoliation in advanced years, a period when, presumably, the fungus fails to find in the epidermis the nutriment upon which it thrives.

ERYTHRASMA.¹

Burckhardt first described this disorder in 1859, but it received its name in 1862 from von Bärensprung. It has since been studied and described by Balzer, Riehl, Koebner, Pick, and others.

Symptoms.—The disease first appears in punctiform to palm-sized, roundish, definitely circumscribed maculations, presenting a sharp contrast in color to that of the adjacent integument. This hue varies somewhat according to the location of the patches. The younger lesions may exhibit a vivid redness over the entire surface or over their borders only. The older lesions exhibit a yellowish or a brownish tinge. These colors are compounds of ordinary erythematous redness and yellowish or brownish discoloration of the horny layer of the epidermis.

The macules are circular or rosette-shaped, or they may display very irregular outlines. They are not raised to any great extent above the general level of the skin, though the finger passed over the surface can recognize a slight elevation of the border, due to hyperemia, and subsequent moderate, flour-like, furfuraceous desquamation, most conspicuous also at the periphery. Vesiculation and papulation do not occur. The colors recognized in different patches may be light reddish-brown, pale reddish-yellow, and light or dark orange.

The eruption is most commonly encountered where apposed surfaces of the skin come in contact, as in the axillæ, the groins, the cleft of the nates, and the regions where the scrotum touches the thigh; it occurs, however, in typical expression on both sides of the chest. The eruption spreads slowly and in serpiginous outline until the affected surfaces are completely invaded. It is much more chronic in its course than the other dermatomycoses, lasting for months and years without apparent change.

Etiology.—Erythrasma is produced by the growth, in the superficial layers of the epidermis, of the fungus described below. Men are much more affected than women; children not at all. The youngest patient whose case is recorded was sixteen years old; the oldest fifty-five.

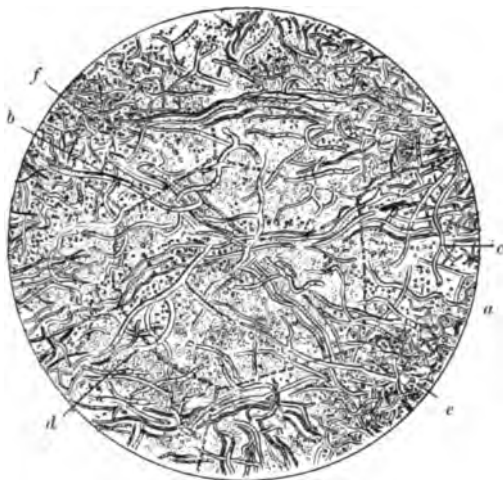
Pathology.—The fungus, termed *Microsporon minutissimum* (Fig. 252), to which the disease is attributed is chiefly remarkable for the extraordinary delicacy and fineness of its threads and its very minute spores. The threads are either simple cylindrical bodies of variable

¹ Payne: Some Rare Diseases of the Skin, London, 1889 (review of literature); Balzer: La Pratique Dermatologique, ii, p. 540 (bibliography).

size, or they may exhibit partition-septa; they may divide dichotomously, and may terminate in hooked or knobbed expansions. They are inextricably interwoven when occurring in large masses. The largest transverse diameter is 0.6μ ; in length the mycelium presents the greatest variation. Bacteria and heaps of zoöglea are visible among the scales. The granules are piled into irregular heaps, according to Burckhardt, and they give a dusty appearance to the epidermal cells on which they lie. Often the outline of these granules is indistinct. According to the same observer, the breadth of the hyphæ is $\frac{1}{1200}$ mm., and the length from $\frac{1}{15}$ to $\frac{1}{200}$ mm.

Pasquale de Michèle¹ discovered the leptothrix in cases of supposed erythrasma.

FIG. 252



Microsporon minutissimum, from patches of erythrasma.

Diagnosis.—From all ordinary chloasmata and pigment-macules the spots of erythrasma are distinguishable by the ease with which the superficially embrowned epidermal layers are removed by erosion. Tinea versicolor is distinguished from erythrasma with greater difficulty; but the latter occurs by preference in different situations, its patches are more vividly tinted, and the parasite, under the microscope, presents distinctive features.

Treatment.—Treatment is that of tinea versicolor.

Prognosis is favorable, subject to the disappointments arising from frequent relapses.

PINTA.

Synonyms.—Mal de los Pintos, Mal Pintado, Pinto, Caraate or Cute, Cativi, Tina, Quirica, Spotted Sickness, Spotted Disease of Central America, Pannus Carateus. Fr., Caraté.

¹ Annales, 1891, s. iii, ii, p. 776.

Definition.—Pinta (Spanish, *pintar*, to paint) is an endemic contagious dermatomycosis, characterized by the development of pigmented patches of different colors upon the skin, unconnected with the general health of the patient, and affecting subjects of both sexes and all ages.

The disease occurs in tropical America, especially in Mexico, Central America, Venezuela, Colombia, Bolivia, Chili, Peru, and Brazil, but has been found also in North Africa, and, it is believed, also in Guiana.¹

Symptoms.—Pinta begins at one or several points of the body-surface, whence it is distributed more or less generally by auto-infection. The disease is said by some authors to be preceded by prodromata of chills, fever, anorexia, cephalalgia, diarrhea, and emesis, lasting for one week, the cutaneous symptoms developing about one month later. The occurrence of such a prodromal stage has, however, been denied.

The eruptive symptoms develop gradually. The hands, face, and other exposed parts usually are involved first. Large areas subsequently are formed by increase in the dimensions of the original macules, and also by their coalescence, the spread of the disease being asymmetrical and peripheral. The spots may be characteristically yellowish, reddish, bluish, blackish, whitish, or violet, the hue at first being monochromatic; later, as the disease spreads, the different colors named above may be exhibited side by side. The patches are well defined. On the scalp the hairs whiten, become atrophied, and fall. The follicle is said not to be invaded by the fungus, but is attacked by a peculiar fibrosis, which induces the atrophy (Castellani). The disease does not affect the palms and soles.

The surface of the body, when extensively involved, presents an odd-looking, piebald appearance, due in part to epiphytic changes and in part to the development of vitiliginous patches in the skin. Itching is produced in various degrees, according to the extent and severity of the disorder. When the affection has lasted for some time, a disgusting odor is exhaled, and the surface exfoliates an early furfuraceous desquamation, which is replaced later by scaling in large flakes.

Two types are described: one superficial, represented by blackish and bluish patches; and a deeper form, said to be more obstinate, with reddish and whitish patches, in which the deeper portions of the epidermis are involved.

Though displayed for the most part asymmetrically, the patches may cover the entire surface of the body, and even invade the mucous membranes of the alimentary tract. When confluence occurs, large areas of the skin may be involved, displaying then the usual features of hyperkeratinization, with pityriasis, occasionally larger and coarser,

¹ BIBLIOGRAPHY: Manson, *Tropical Diseases*, p. 776. Gomez: *Du Carathés ou Tache endémique des Cordillères*, Paris, 1879. Hirsch, *Handbuch histo-geogr. Pathologie*, 1883, 2d ed., ii, p. 263. Montoya and Florez, *Annales*, 1897, s. iii, viii, p. 464. Castellani and Chalmers, 1913, p. 1513. Wooley, *Jour. Cut. Dis.*, 1904, xxii, p. 479.

scales, infiltration, occasional fissuring, and complete or partial color-change and loss of hair. In final evolution, the symptoms are highly suggestive of other dermatoses, such as trichophytosis, favus, some of the forms of lupus, and erythematous eczema. There may be ulcerative complications.

Etiology.—Pinta is a contagious disease affecting persons of both sexes and all ages save infants; but it is much more common among the filthy and the neglected than in others. It is produced by the growth of a cryptogamous fungus in the superficial portions of the skin.

Pathology.—Scales scraped from the skin, moistened with potassium hydroxid and placed under a microscope exhibit round or oval, blackish spores, 8–12 μ in diameter; and highly refractile, short, dichotomous filaments of mycelium are distinguishable. The effective parasites recognized by Montoya y Florez (cited by Manson) are fungi, chiefly *Penicillium*, *Aspergillus*, and *Monilia*. Fine filaments furnish hyphæ, which terminate in clubs, surrounding chaplets of spores. Sterigmata encircle the sporulating elements. The fungi are found chiefly in the superficial layers of the epiderm, but may also, in advanced cases, be recognized in the rete. Whether the differences in color be due to variations in the fungi or to pigmentation of the spores and filaments is not determined.

Diagnosis.—The patches of chloasma, vitiligo, and lepra are distinguished readily from those of pinta by considering that, in the two diseases first named, there are no surface-changes in the horny layer of the epidermis, and in the second the existence of a systemic affection is established readily. The absence of anesthesia in the patches of pinta, the discovery of *Microsporon furfur* in tinea versicolor, and of *Microsporon minutissimum* in erythrasma, and the special characters of the psoriasiform dermatoses, are all of significance. Care should be taken to exclude the symptoms of the prefungoid stage of granuloma fungoides.

Treatment.—Chrysarobin, sulphur, iodine, naphthol, and, if needed, corrosive sublimate lotions have been found useful. Cleanliness and strict observance of the requirements of hygiene are demanded, especially in the class of patients who are affected most often by the disease.

Prognosis.—The disease may persist indefinitely if not relieved. It yields to proper parasitocidal treatment. Mild relapses occur. The general health is not involved.

MYCETOMA.¹

Synonyms.—Podelcoma, Madura Foot, Morbus Pedis Entophyticus, Ulcus Grave, Endemic Degeneration of the Bones of the Foot, Morbus

¹ **BIBLIOGRAPHY:** Adami and Kirkpatrick, Trans. Assoc. Amer. Phys., 1895, x, p. 92. Arwine and Lamb, Amer. Jour. Med. Sci., 1899, cxviii, p. 293. Boyce, Hyg. Rundsch., 1894, iv, No. 12. Surveyor, Brit. Med. Jour., 1892, p. 575. Carter, Treatise on Mycetoma, or the Fungus Diseases of India, London, 1874. Dantec, Le, Arch. de Méd. naval,

Tuberculosis Pedis, Elephant Foot, Madura Disease, Fungus Foot of India, Fungus Disease of India, "Egg-foot." Ger., Madurafuss; Ind., Perical, Slipada; Fr., Mycétome, Pied de Madura.

Definition.—Mycetoma is a localized affection, limited to the skin and adjacent parts, due to invasion of the tissues by vegetable parasites, and characterized by the production of an unshapely tumefaction of the invaded part, which becomes covered with nodules or tubercles, for the most part penetrated by fistulous sinuses. The disease not only affects the skin, but also the underlying structures to a variable extent. It long was thought to be a malady occurring only in India, but more lately has been recognized in China, Syria, parts of Africa, and in both North and South America.

The disease was first referred to by Kaempfer,¹ in 1712, though Carter was the first to describe it as an entity caused by a specific parasite. American cases have been recognized and recorded by Adami and Fitzpatrick; Hyde, Senn and Bishop; Arwine and Lamb; Pope and Lamb; Wright, and Sutton. In addition, Parkes reported operating on a case of mycetoma in Chicago. The disease, however, in this instance was contracted in India.

Symptoms.—Three varieties of mycetoma were once loosely distinguished by the color of the morbid material contained in the discharge, viz., the black, the red, and the white or ochroid; the last-named the most common, the second the rarest, the black rather less frequently encountered than the white. The part principally affected in most of the Indian and in the American cases is the foot, and this chiefly of persons walking barefoot; but the hand, the shoulder, the thigh, the knee, the toe, the abdominal wall, the scrotum, and other regions have been attacked. Simultaneous involvement of different regions of the body has never been noted.

In a typical case the sole of the foot is involved by progressive spread of the disease from the site of a trifling traumatism, which often at first heals, but is followed later by the development, near the site of the wound, of a rounded, firm, painless, small-nut-sized, subcutaneous button or nodule, which increases slowly in volume and later is

1894, p. 447. Gémy and Vincent, *Annales*, 1896, s. iii, vii, p. 1253. Hatch, Keith, and Childe, *Lancet*, 1894, p. 1271. Hyde, J. N., Senn, N., and Bishop, D. D., *Jour. Cut. Dis.*, 1896, xiv, p. 1 (bibliography). Kanthack, A. A., *Lancet*, 1892, i, p. 195, and ii, p. 169; *Jour. Path. and Bact.*, October, 1892. Manson, *Tropical Diseases*, 4th ed., p. 760. Palttauf, *Intern. klin. Rundsch.*, 1894, No. 26. Pope and Lamb, *New York Med. Jour.*, 1896, lxiv, p. 368. Ruelle, *Contribution a l'Étude de Mycétoma*, Bordeaux, 1893, p. 13 *et seq.* Scheube, *Diseases of Warm Countries*, 1903, p. 552 (full bibliography). Shah, T. M., *Med. Rep.*, Calcutta, 1893, p. 225. Vincent, *Annales de l'Inst. Past.*, 1894, p. 129. Wright, *Trans. Assoc. Amer. Phys.*, 1898, xiii, p. 471. Emma Dübendorfer, *Ein Beitrag zur Histologie und Bakteriologie des Madurafusses*, *Archiv*, 1907, lxxxviii, Band 1, pp. 3-10 (1 clin. illustration, 4 hist. illustrations). Clemon, *Brit. Med. Jour.*, April 21, 1906, p. 918. Oppenheim, *Archiv*, 1904, lxxi, p. 209; *abstr. Jour. Cut. Dis.*, 1905, xxiii, p. 411 (pathological anatomy of the black variety). Wright, *Osler's System of Modern Medicine*, i, p. 344. Musgrave and Clegg, *Philippine Jour. of Sci.*, 1907, ii, No. 6. Sutton, *Jour. Amer. Med. Assoc.*, 1913, lx, p. 1339: Mycetoma in America (report of two cases, with histological study; bibliography).

¹ Kaempfer, 1712: *Amanitatum Exoticorum Politico-Physico-Medico*, v, p. 561 (quoted by Castellani and Chalmers, *Tropical Medicine*, 2d ed., p. 1527).

PLATE XXXI



Mycetoma of the Foot.
(From a painting.)

surrounded by similar lesions. In the course of five to ten weeks or more, the tumor softens and bursts, discharging a characteristic viscid, "oily," semipurulent, blood-streaked fluid, which contains minute, roundish (grayish, reddish, or blackish) particles, which have been compared to fish-roe. These may be agglomerated in pea-sized masses. At the site of each lesion a permanent sinus penetrates

FIG. 253



Osseous lesions in mycetoma.

deeply beneath, and is said never to undergo spontaneous healing. The repetition of the process by the multiplication of nodules and fistulous tracts produces eventually the deformity characteristic of the disease. The progress of the malady may be exceedingly chronic, as ten and more years have been recorded not rarely as requisite for its complete evolution.

In fully developed cases, when the foot is involved, that organ is seen to be largely increased in volume, producing without elongation an elastic bulging of the parts posterior to the digits, over the dorsum above and below over the plantar region, giving the sole a convex appearance. The toes may be in forced separation or misdirected. Over the tumid parts, the skin is beset with numerous pea- to nut-sized, isolated nodules, elevated to the extent of several millimeters above the general level, each pierced with a fistulous channel extending from without to the deeper structures. At times these fistulous tracts lead only to the soft parts, and especially to muscular tissues; at others the surface of the bone is reached and the osseous tissue is eroded by the growth of the parasite and the coccogenous infection which results from long exposure of the parts to the air. It is through these fistulous orifices that in different cases exit is given to a blackish, fish-roe-like substance, or to a whitish material, or even still more rarely, as indicated above, to a reddish substance.

In place of nodules or papules, the skin may be the seat of pustules, vesicles, bullæ, or even of abscesses. When but relatively small organs of the body are invaded, such as a finger or a toe, it becomes clear that the tumefaction is not due chiefly to a hypertrophy either of the integument or the bones. When the foot is affected seriously, the leg above commonly atrophies from disuse.

The discharge varies in different cases. In some it is almost wholly wanting; in others it is scanty; in yet others exceedingly profuse and fetid. It is generally oily or syrupy in character. When blackish in hue, the contained granules have been likened to truffles or fish-roe; when of paler hues, it resembles fish-spawn.

The course of the disease is exceedingly chronic; and while one or more nodules have been seen to heal, the mass of the disease persists until relief is obtained by artificial methods.

Pain is usually not pronounced; sensibility is maintained; and the general health may be undisturbed for long periods of time. Death, when it ensues, results from long-continued drain upon the vitality of the patient.

Etiology and Pathology.—The disease is caused by invasion of the tissues of the body by vegetable parasites. It is probable that the parasites secure access to the skin through the medium of a traumatism; and the occurrence of a large majority of all cases on or near the foot, most often in men, and among individuals who have been walking barefoot, lends support to this view. Further, the origin of a few cases has been traced to foot-lesions (bruising of the organ with a stone and consequent abscess; injury with a pitchfork, or a fall on the knee); while the relative freedom of persons who protect the feet while residing in the districts where the disease is common is in evidence. The lower classes of poor agriculturists, during the twentieth to the fiftieth year of life, are most liable to the affection, while children and infants escape. The origin of the disease has not been traced to any peculiarities of soil.

Several varieties of the fungus producing the disease in its various manifestations have now been differentiated. Castellani and Chalmers arrange them, according to the color of the granules, into three groups: a melanoid, an ochroid, and a red group. These are further subdivided into fifteen varieties.¹ On microscopic examination the fungi present many resemblances to the actinomyces, but their identity is not accepted by most investigators. Morphologically and tinctorially, the differentiation may be made.

In a well-advanced case, on section the foot is found to be tunnelled in various direction by sinuses, which communicate with oval or roundish cavities. The latter may be superficial or deep, and may occupy the soft tissues or the bones, and have a connective-tissue lining. Here the granules, singly or in masses (mulberry-like), are found, as well as in the neighboring softened tissues.

In the period of early reactive inflammation, the fungus is surrounded merely by the results of cell-proliferation; typical granulation tissue, epithelioid cells, and new vessel-formation follow. Somewhat later plasma-cells, giant-cells, and amorphous granular masses occur, and finally degenerative changes attack the entire area.

The bones when denuded are found to be honeycombed with finely carved seams, depressions, furrows, and pits, leaving delicate spicules of osseous tissue projecting between the excavations wrought by the growth of the parasite. It is possible to find, as Adami suggested in the study of his case, intrusive organisms, the result of exposure for so long a period of time of the deeper tissues to the atmosphere.

Diagnosis.—In all cases of long standing, the disease is readily recognized by the characteristic deformity produced; in certain varieties of the affection by the escape of fish-roë-like particles; and in all by microscopic recognition of the parasites present. In well-defined instances, the nodes or papules externally visible are often perforated with sinuses leading downward to the deeper structures. The painlessness of the invaded part is also characteristic.

Treatment.—Early in the disease potassium iodid may be employed, with curettage and packing of the superficial lesions. As a rule, amputation is the only method of eradicating the disease.

Prognosis.—As spontaneous recovery does not occur, the prognosis depends upon the treatment employed.

ACTINOMYCOSIS OF THE SKIN.

Synonyms.—"Lumpy-jaw." Ger., Aktinomykose; Fr., Actinomycose.

In 1877 Ponfick proved that the disease first recognized by Bollinger in the jaws of cattle was the same as that which Israel, in 1877, had

¹ For details, see Castellani and Chalmers' *Manual of Tropical Medicine*, 2d ed., pp. 1533, 1534, and 1535.

observed in man.¹ Hartz, judging largely from its morphological character, described the parasite as the ray-fungus. Majocchi was the first to describe the disease as it involves the skin.

Symptoms.—In actinomycosis, the parasite commonly gains access to the economy by the mouth, especially by the avenue of a carious tooth; and the skin, when implicated, as a rule is involved secondarily. Such skin-lesions as are displayed are more often about the face and neck, more particularly the lateral surfaces of the neck beneath the jaw, where deep subcutaneous nodes, tumors, or swellings may form. These are often firm to the touch, livid in hue, thinning at one or at several points after involvement of the integument, and finally bursting, forming fistulous tracts, which give exit to a sero-sanguineous or bloody and purulent fluid, containing friable, yellowish or grayish masses, in which the fungus may be recognized. The orifices of the sinus or sinuses after such discharge are usually beset with cutaneous

FIG. 254



Actinomycosis.

and subcutaneous nodules and uneven lumps, some softened, others firm and indurated, usually reddish or purplish in hue, tender, painful, and often accompanied by pains elsewhere, particularly in mastication, in deglutition, and in certain movements of the head. The outlying skin becomes infiltrated, tumid, empurpled, and boggy. Rarely papillomatous growths develop.

Primary actinomycosis of the skin is rare. Wallhauser² observed an extensive case, in which the primary infection occurred on the point of the chin, from without. From this site the disorder spread by the

¹ REFERENCES: Neumann's Atlas, Plate XIII; Morris, *Lancet*, June 6, 1896; Pringle, *Med.-Chir. Trans.*, 1895; Kopp's Atlas, Plate LXXV; Corlett, cut appearing in Stelwagon's *Treatise*, 1914, p. 1155; Illich, *Wien*, 1892; Darier et Gautier, *Annales*, 1891, p. 449; Ponfiek, *Treat.*, Berlin, 1882; Israel, *Treat.*, Berlin, 1884; Skerritt, *Amer. Jour. Med. Sci.*, 1887; Poncet et Bérard, *Trait.*, Paris, 1898; Bodamer, *Med. News*, 1889; Crookshank, *Lancet*, 1898, p. 11; Legrain, *Annales*, 1891, s. iii, ii, p. 772; Baracz, *Wien. med. Presse*, 1889, xxx, p. 6; Ljunggren, *Nord. med. Arch.*, 1895; Kopfstein, *Wien. med. Rundschau*, 1901, p. 21; MacCullum, *Centralb. o. Bakliv.*, 1902, xxxi; Howard, *Jour. Med. Research*, 1903, ix, p. 301.

² *Jour. Cut. Dis.*, 1901, xxii, p. 77.

formation of papules and nodules in the usual manner. Merian¹ found only 25 recorded cases occurring primarily in the skin.

The onset of the disease is insidious, and, though occasionally rapid in its career, its evolution may extend over months and even years. The nearer to complete development of the disease, the more rapid, as a rule, is the oncoming of its symptoms. In exceptional cases the malady attacks the fingers, the hands, and other parts of the body. Rarely, secondary actinomycosis of the lymphatic glands occurs. Pringle reported a case in which large areas on the back, lumbar region, and hip were affected secondarily after involvement of deeper organs.² Lymphatic metastasis is, however, rare, due, it is believed, to the large size of the fungus-granules as compared with the lumen of the lymphatic vessels. Subjective symptoms may be insignificant or be related to the pain and stiffness of the neck concurrent with the subcutaneous abscesses.

Etiology and Pathology.—More men than women are attacked, as a result of special exposure; a few of the affected have been occupied with cattle and horses; others, having carious teeth, may have been infected by accidents of contact or in the operations of dentistry. The subjects are usually young adults, though we have treated a male patient over sixty years of age. Cases are on record of transmission from man to man, from animals to man, and by traumatism, when inanimate objects were the media by which the fungus was introduced. The affection is communicable by inoculation. In most instances there have been submaxillary lesions and carious teeth. The general dispersion of the fungi in the atmosphere, water, and upon the soil is held to explain in large measure the occurrence of the disease in man. Beards of barley, bits of wood and stone, and vegetable fragments have been found in actinomycotic lesions.³

The pathological anatomy of actinomycosis is practically that described in Mycetoma. In the most commonly recognized type of the disease, the fungus is found in the yellowish or grayish masses discharged in clumps from the fistulous tracts and found also in sections of morbid tissue. Often there are seen fine interlacing threads or filaments radiating from a common centre, some considerably projected above their fellows, many with a bulbous expression at the tip ("clubs"). The threads are slender, sinuous, often with dichotomous branches, and have an external sheath and protoplasmic medulla. The filaments grow rapidly and probably produce the disease. Coccus- and bacillus-like cells, regarded by Boström as spores, are also present.⁴

¹ Derm. Wochenschr., January 13, 1912; abstr. Brit. Jour. Derm., 1912, xxiv, p. 320.

² Med.-Chir. Trans., 1895, lxxviii, p. 21.

³ Hektoen, International Clinics, vol. iv, 9th series: The General Etiology of Actinomycosis (bibliography); Varney, Jour. Cut. Dis., 1909, xxvii, p. 234 (history of chewing kernels of wheat); Alworthy, Brit. Jour. Derm., 1909, xxi, p. 395 (patient chewed and ate uncooked oatmeal).

⁴ Hektoen, Phila. Monthly Med. Jour., November, 1899: The Classification and Nomenclature of the Ray Fungi; and Chicago Med. Recorder, June, 1900: The Ray Fungi and the Actinomycelial Processes.

Diagnosis.—All supraclavicular and submaxillary lesions constituted of dark reddish tumors or swellings, subcutaneous in origin, call for scrutiny. Scrofuloderma is to be recognized by the general condition of the patient (actinomycosis may occur in vigorous young adults); by the absence of pronounced gumma and lymphoma (*gomme scrofulouse*); and by the absence of the parasite. The occupation of the subject of the disease (as a farrier, stable-boy, or drover) may furnish a clue to the nature of the disorder in some cases. Care should always be taken, in making a diagnosis, to exclude cases of swellings discharging pus, practically limited to the skin immediately over the lower jaw, with sinuses leading to the bone beneath, which disorder is exclusively due to a carious fang of one of the lower central or canine teeth.

Treatment.—The treatment is both internal and local. Internally, potassium iodid has been found of great value in many cases. It is employed in the same manner as in syphilis, beginning with 5 or 10 grains, and increasing gradually until the toleration of the patient is reached. It should be given well diluted and after meals. Copper sulphate, as suggested by Bevan,¹ is used internally in the dosage of from $\frac{1}{4}$ to 1 grain (0.016 to 0.065) three times daily, and locally in a 1 per cent. solution as an irrigation or wet dressing. This method has proven of value in many cases. Surgical procedure, as indicated in the various cases, should be employed, as well as local antiseptic dressings and applications, which include the mercuric chlorid, Lugol's solution, and boric acid. Gautier has employed with success an electro-chemical method of treatment, by the use of platinum needles and injections of a 10 per cent. potassium iodid solution. Two needles are inserted, one connected with each pole of the battery, and a current of 50 milliampères is passed. A few drops of the iodine solution are injected during the flow of electricity, the patient being anesthetized. X-rays have been used during the last few years with beneficial results. In three cases treated by the author, treatment with a combination of x-rays and potassium iodid was followed by complete recovery. Copper sulphate, combined with x-rays, was successful in the case recorded by Zeisler.²

Prognosis.—The prognosis is necessarily grave, on account of possible internal involvement. It was held until recently that the prognosis was favorable only in case of thorough and prompt removal of all diseased tissue. Schlange, at the Congress of German Surgeons held in 1890, called attention to the fact that of nearly two hundred patients under his observation, forty had remained well for more than two years, and in eighty the disease remained limited to the head and neck. After thirteen years of involvement, one patient at the date of the report was relieved. Untreated, the disease may eventually destroy life after years of exhaustive drain.

¹ Jour. Amer. Med. Assoc., November 11, 1905, p. 1492.

² Jour. Cut. Dis., 1906, xxiv, p. 510.

BLASTOMYCOSIS.¹

Synonyms.—Blastomycetic Dermatitis, Saccharomycosis Hominis, Dermatitis Blastomycotica. Ger., Hefenmykose.

Definition.—Cutaneous blastomycosis is a chronic, inflammatory, infectious disease, characterized by the appearance upon the skin of a small papule or papulo-pustule, which becomes crusted and extends peripherally to form a sharply outlined, elevated, verrucous patch, situated upon a pus-infiltrated base, and presenting a characteristic abruptly sloping border, in which are seen minute, deeply seated abscesses. Blastomycetes are found in the sero-purulent contents of the abscesses, from which both budding and mycelial forms of the organism have been obtained in pure culture.

The invasion of the bodies of animals by blastomycetes had been studied before the disorder was recognized in the human family. In 1894 Busse published an account of a fatal case of pyemia, with subcutaneous abscesses and cutaneous manifestations, in which the pathogenic agent was a yeast. A few months earlier, Gilchrist

¹ **BIBLIOGRAPHY:** For a more detailed review of the clinical, histological, and bacteriological features of cutaneous blastomycosis, with 16 clinical and 25 histological and bacteriological illustrations, a brief summary of 13 cases, and bibliography, see report by Hyde and Montgomery, *Jour. Amer. Med. Assoc.*, 1902, i, p. 1436. For a full consideration of experimental work, and animal inoculations with blastomycetes, see Buschke's complete monograph, *Bibliotheca Medica*, D. II, H. 10, 1902 (illustrations and bibliography); and monograph: "De la Blastomycose humaine," by Harter, Nancy, 1909.

Additional reports: Gilchrist, a case in a negro, with illustrations, review, and bibliography, *Brit. Med. Jour.*, 1902, ii, p. 1321. Sheldon, report of a case, *Jour. Amer. Med. Assoc.*, 1902, ii, p. 1356. F. H. Montgomery, a case of cutaneous blastomycosis followed by systemic tuberculosis, *Jour. Cut. Dis.*, 1903, xxi, p. 19. Ormsby and Miller, a systemic case, with multiple cutaneous and subcutaneous lesions (a full report, with illustrations), *ibid.*, p. 121. Sequeira, report of a case, *Brit. Jour. Derm.*, 1903, xv, p. 121. Evans: "A case of Cutaneous Blastomycosis from Accidental Inoculation," *Jour. Amer. Med. Assoc.*, 1903, p. 1772. Pusey, two cases presented to the Chicago Derm. Soc., *Jour. Cut. Dis.*, 1903, xxi, p. 223. Fischkin, report of a case, *Ill. Med. Jour.*, 1903, v, p. 472. Gilchrist, three cases, with 4 clinical illustrations and abstract of McGarrison's report of a case which occurred in a native of Northern India, *Jour. Cut. Dis.*, 1904, xxii, p. 107. Hessler, *Ind. Med. Jour.*, 1898, xvii, p. 48. Hyde, Hektoen and Bevan, *Brit. Jour. Derm.*, 1899, xi, p. 261. Hektoen, *Jour. Exper. Med.*, 1899, iv, Nos. 3 and 4. Owens, Eisen-drath and Ready, *Annals of Surg.*, 1899, xxx. Murphy-Hektoen, *Jour. Amer. Med. Assoc.*, 1899, xxxiii, p. 1383. Anthony-Herzog, *Jour. Cut. Dis.*, 1900, xviii, p. 1. Coates, *Medicine*, February, 1900. Brayton, *Ind. Med. Jour.*, April, 1900, July, 1901, and *Jour. Amer. Med. Assoc.*, February 1, 1902. Montgomery-Ricketts, *Jour. Cut. Dis.*, 1901, xix, p. 26. Dyer, *ibid.*, p. 14. Stelwagon, *Amer. Jour. Med. Sci.*, 1901, cxxi, p. 178. Harris, *ibid.*, p. 501. Ricketts, *Jour. Med. Research*, vi, No. 3. Bevan, *Jour. Amer. Med. Assoc.*, November 11, 1905. Montgomery and Ormsby, *Arch. Intern. Med.*, August, 1908: "Systemic Blastomycosis—Its Etiologic, Pathologic, and Clinical Features, as Established by a Critical Survey and Summary of 22 Cases, 7 Previously Unpublished; the Relation of Blastomycosis to Coccidoidal Granuloma." (In this review the authors give an abstract of twenty-two established and five probable cases of systemic blastomycosis. For a review of the entire subject the reader is referred to the original article.) Krost, Moes and Stober, a case of systemic blastomycosis, *Jour. Amer. Med. Assoc.*, January 18, 1908. Shields, two cases of blastomycosis, one systemic and fatal, *Jour. Cut. Dis.*, 1909, xxvii, p. 156. Fontaine, Haase and Mitchell, systemic blastomycosis, *Arch. Intern. Med.*, 1909, iv, p. 101. Shepherd, systemic blastomycosis, a fatal case, *Jour. Cut. Dis.*, 1911, xxix, p. 588. For other systemic cases, see *Arch. Intern. Med.*, April 15, 1914, xiii, No. 4; reports by Stober, Krost, Moes, Lewison, Jackson, Myers, Boughton, Bechtel, LeCount, Eisenstaedt, Shaffner, Churchill, Clark, Riley, and Bartlett.

had demonstrated before the American Dermatological Association microscopic sections containing budding organisms from a lesion which Duhring considered a scrofuloderm. Later communications from Busse and Buschke and from Gilchrist and Stokes have been followed by reports from a number of observers. Among those whose important work has furthered our knowledge of the disease should be mentioned Hyde, Montgomery (Frank Hugh), Hektoen, Bevan, Ricketts, and Wells. The records of about one hundred cases, published or unpublished, in which the nature of the disease has been demonstrated satisfactorily, are now available. The following description is based chiefly on the clinical, pathological, and bacteriological study of a large number of cases of both cutaneous and systemic blastomycosis.

Symptoms.—The disorder in the skin begins as a papule or papulopustule, which soon becomes covered with a crust. The lesion slowly enlarges peripherally in the form of an indolent, flat, wart-like or crusted papule. In the majority of all cases the lesions had existed a number of months and had attained a diameter of an inch or more before the patient applied for treatment.

In lesions that have attained the diameter of half an inch or more, the following characteristics are apparent: The patch is elevated from one-eighth to three-eighths of an inch above the surrounding skin; and the surface is covered by irregular, papilliform elevations, separated by clefts or fissures of varying depth, giving it a verrucous or cauliflower-like appearance. In the younger lesions and near the border of the older ones, especially of those which have been kept clean, the papillary projections are fine and the surface is fairly firm, dry, and wart-like. Portions of larger areas, and especially of those which have been untreated, are covered by more or less bulky and adherent crusts, on removal of which the papillary elevations are seen to be larger, lobulated, even subdivided, and bathed with a sero-purulent secretion. Some of these crust-covered projections are very vascular, a slight touch causing them to bleed. In exceptional instances, the area under a crust may present the appearance of an ordinary unhealthy ulcer, with exuberant granulations. In older lesions, the papillomatous surface may be replaced in part by a thick, elevated, scar-like formation, pinkish-white in color, irregular and often corded, but having a smooth, shining surface. The base of the active lesion is always soft and more or less infiltrated with sero-pus, which, on slight pressure, oozes between the papular elevations.

The border of the area is one of the most characteristic features. It slopes more or less abruptly from the elevated, roughened surface to the normal skin, from which it is sharply defined. It is smooth, of a dark-red or purplish-red color, is from one-eighth to three-eighths of an inch wide, and on close inspection is seen to be beset with a large number of minute abscesses. Many of these abscesses are so small that they are not visible to the naked eye, but can be recognized with a lens magnifying from two to six diameters. Others vary in

PLATE XXXII



Blastomycosis.

(From a photograph.)

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size up to that of a pinhead. Some are superficial, but many, especially the smaller ones, are deep-seated. When carefully punctured with a fine needle, these abscesses give exit to a small amount of thick, glairy mucus or muco-pus, the purulent character of the secretion increasing with the size of the pustule. From the smallest abscesses the amount of mucus expressed is sometimes so scanty that it can only be seen with the aid of a lens, yet it is from these minute abscesses that the organisms are best obtained in pure culture. Abscesses of the same sort occur also in other parts of the growth, and not infrequently on the thick, scar-like tissue described above; but in characteristic development they are best seen on the sloping border. The number of abscesses varies in different cases and in the same case at different times, depending somewhat upon the activity of the process.

The cutaneous lesions found in the systemic cases only occasionally correspond to the above description. They are found chiefly in the form of irregular, ragged, rather superficial ulcers, having a soft base, a granulating floor, and a purulent or sanguineo-purulent discharge, which often forms bulky crusts. These ulcers are usually preceded by subcutaneous abscesses, which gradually or rapidly extend to the surface and rupture externally. These subcutaneous nodules and abscesses are characteristic of the systemic cases, and often occur in successive crops.¹

The course of the disease is irregular but essentially chronic. Usually months elapse before the original patch attains the diameter of an inch or more. It may remain indolent for months or even years, with irregular periods of activity and progress, but, as a rule, extension of the area is slow and continuous. In about half the cases the original patch of the disease has been followed in the course of weeks or months by one or more new lesions in adjacent or other regions of the body. In some instances, the clinical evidence of autoinfection has been very strong. The majority of the areas sooner or later attain the size of a silver dollar or of the palm, and some of them become much larger. As the disease extends at the periphery, healing frequently occurs in the central portion of the growth. In this manner large areas (in Anthony and Herzog's patient, the greater portion of the thigh and leg) may be involved in various stages of the process. Healing sometimes occurs spontaneously. Whether spontaneously or as the result of treatment, the first indication of healing is found in the gradual flattening and disappearance of the papillary projections, partly by absorption, partly by desiccation and exfoliation. At the same time the amount of secretion from the underlying base diminishes, and the whole patch assumes more of an ordinary verrucous appearance. In many instances, the papilliform surface is replaced temporarily by the hypertrophic scar-like tissue described above, which in turn gradually disappears and gives place to the characteristic cicatrix, which eventually becomes soft, supple, non-attached, pinkish-white, and, on the

¹ Arch. Intern. Med., August, 1908.

whole, very inconspicuous, though always sharply outlined from the surrounding skin. As a rule, the resulting deformity is very slight. In some instances, where destructive agents or scraping operations have been employed, the disappearance of the characteristic lesion is followed by an ordinary indolent ulcer, which heals with a thickened and somewhat deforming scar.

During the healing process, though the miliary abscesses decrease in number, careful search will reveal them even in scar-tissue that has become quite thin and soft. It is consequently not uncommon to see areas that apparently have healed become more or less covered again with active points or foci of disease. A single patch may thus present nearly all stages of the disorder, showing at the same time several of the following features: the advancing border; new-forming lesions on old scars; verrucous or cauliflower-like lesions in various stages of development or disappearance; a base in places dry and firm and in others soft and infiltrated with muco-pus; a scar-tissue, in part thick and irregular and in part smooth, soft, supple, and non-attached to the deeper tissues.

The regions involved are usually those most accessible to local infection, the disease occurring with greatest frequency on the face, hands, wrists, or forearms; but no portion of the body is exempt. The eyelids are a frequent seat of the disease, but the conjunctiva escapes, though ectropion, resulting from destruction of the lid, causes conjunctivitis and keratitis, due to exposure. Adenopathy has been noted in systemic cases only, though pus-infection of lesions may be followed by a transitory involvement of adjacent glands.

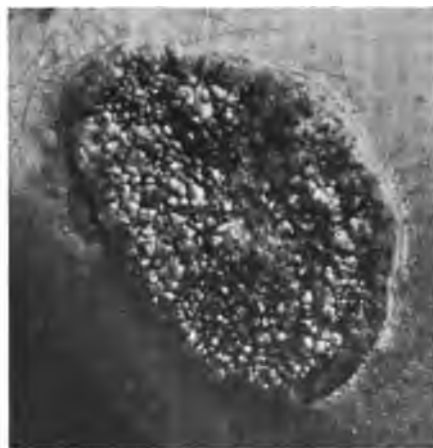
The subjective sensations of the disease vary greatly. As a rule, pain is slight or absent, except in areas which are acutely inflamed as a result of secondary infection.

The majority of patients have been in good general health, though some have suffered from other systemic disorders, which evidently bore no definite relation to the blastomycosis. Of the entire number recorded, one patient only died of generalized tuberculosis. In nineteen cases death occurred from systemic infection with blastomycetes, the organisms being demonstrated at the autopsy in the viscera, and in three cases in the blood. One of the nineteen patients (Montgomery-Walker case) remained in vigorous health for seven years after the appearance of cutaneous lesions, and then rapidly developed grave constitutional symptoms.¹

Etiology.—A local infection with the fungus peculiar to each case is the sole recognized cause of the disease. In one instance, a slight wound of the finger incurred at the autopsy of a case of systemic blastomycosis was followed in one week by the appearance at the site of the injury of a pustule, which refused to heal and later developed into a typical cutaneous lesion, in which budding organisms were

¹ Arch. Intern. Med., August, 1908 (discussion of clinical symptoms exhibited in systemic cases).

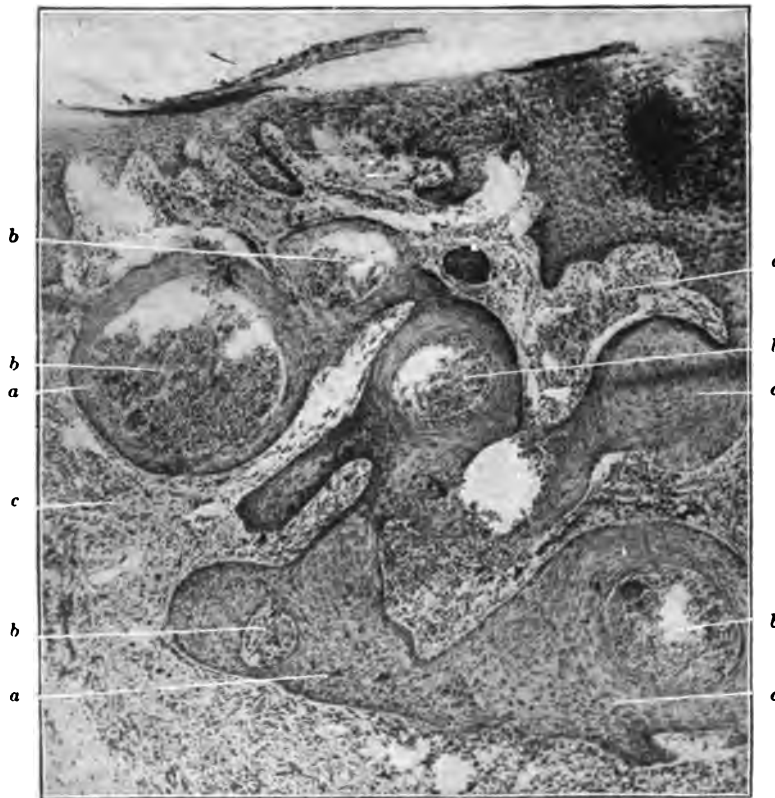
PLATE XXXIII



Clinical Types of Cutaneous Blastomycosis.

demonstrated repeatedly. The infectious character of the disorder is demonstrated further by the successful inoculation of animals. In several instances there has been a history of trauma preceding infection. What other conditions favor the origin and development of the process has not been determined. Why certain yeasts and mould-fungi are pathogenic, while others are innocuous; how common in nature the pathogenic varieties are; and how they differ from the ordinary varieties, are unsolved problems.

FIG. 255



Vertical section from a typical lesion: *a*, hyperplasia of rete; *b*, abscesses in epithelium; *c*, infiltration of cutis. $\times 55$.

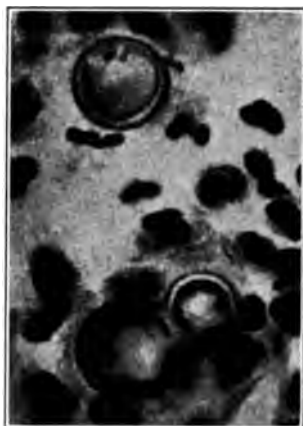
No relation has been discovered between the disease and the sex, nativity, occupation, or habits of the individual affected. The fact that the majority of cases occur in men is due probably to their more frequent exposure to infection. About half the cases have occurred after the age of forty, with the majority of the remainder between the ages of twenty and forty. In one case observed by the author¹

¹ Jour. Cut. Dis., 1908, xxvi, p. 235.

the patient was 76 years of age. Recently, it has been observed in younger subjects, the youngest¹ being eight months old at the time the nature of the disease was established. No definite relation between blastomycosis and other local or systemic disease has been demonstrated. The possibility of blastomycotic infection being secondary to lesions of other disorders or to trauma is admitted; it is equally possible for the lesions of blastomycosis to be infected secondarily with tuberculosis or other disease.

Pathology.—Histologically, the lesions resemble those of verrucous tuberculosis or of superficial epithelioma, yet differ from both. The surface, on which are seen irregular masses of débris, consisting of pus, blood, and epithelial cells and various bacteria, is marked by irregular

FIG. 256



Blastomycosis of the skin. Budding organism in tissue. $\times 1200$.

FIG. 257



Blastomycosis of the skin. Hanging drop. $\times 1200$. From a photograph.

papilliform projections, between which are corresponding depressions. The horny layer may be destroyed or it may extend in thickened masses between distorted papillæ.

The rete is everywhere the seat of excessive hyperplasia, producing branching down-growths, varying greatly in size and shape. Polymorphonuclear leukocytes are scattered throughout the epithelium, both between and within the cells, and occur often in small collections, which are the beginning of miliary abscesses. These abscesses are characteristic of the process, and are found in all parts of the hyperplastic epithelium, in places breaking through to the surface. They contain leukocytes, nuclear fragments, detached epithelial cells, epithelial detritus, red blood-corpuscles, the organisms peculiar to

¹ Kessler, J. B., Jour. Amer. Med. Assoc., 1907, xlix, pp. 550-552.

the disease, and in many cases giant-cells. The epithelial cells surrounding the abscesses are flattened, but appear to take no active part in the process. The epithelium is separated from the corium in most places by a distinct layer of columnar cells, in which mitoses are seen occasionally. The rete-cells in general are large and appear swollen, the prickles being very conspicuous and the intercellular spaces increased. Premature cornification, more or less complete, occurs in scattered individual cells, in groups of cells, and occasionally in isolated epithelial whorls. Single giant-cells, surrounded by a few leukocytes, are sometimes seen in the epithelium at some distance from the corium.

The corium is the seat of subacute, chronic, and occasionally of acute inflammatory changes. Miliary abscesses occur, especially in acute lesions. The infiltration consists chiefly of leukocytes, endothelial cells, and plasma-cells, and is sometimes very dense. The number of mast-cells and giant-cells varies in different cases. Tubercle-like nodules are found in some instances. In several cases sections showed numerous hyalin bodies, which varied greatly in size, and occurred chiefly in plasma-, giant-, and new connective-tissue cells.

The appendages of the skin apparently play but a passive part in the process.

The blastomycetes are found in miliary abscesses, between the epithelial cells and in the corium, and are always surrounded by more or less evidence of inflammation. They are rarely found within the cells. The giant-cells, however, usually contain one or more of the parasites. The number present in the tissue varies greatly. In some cases a dozen or more can be seen in a single field of the microscope, while in others they are found with difficulty. They occur usually in pairs of unequal size, but also singly and in groups. They are readily seen in sections stained with hematoxylin and eosin or other common stains, but methylene blue is best for showing the different parts of the organism. The fungus is easily demonstrated by placing fresh or hardened sections, or pus, in a strong solution of potassium hydroxid, or in equal parts of liquor potassæ and glycerin; the organisms then appear as double-contoured, highly refractive bodies.

When well stained, the parasite is seen to be a round, oval, or slightly irregular body, having a well-defined, double-contoured, homogeneous capsule, and a finely or coarsely granular protoplasm, which is separated from the capsule by a clear space of varying width. The capsule resists the prolonged action of strong alkalies and acids. The protoplasm often contains a clear vacuole, which varies greatly in size in different bodies. Mature organisms have a diameter of from 7 to 20 μ , though smaller and larger forms are seen occasionally.

Budding forms are seen in all stages of development. The capsules and clear space are pushed out apparently by the protoplasm to form oval buds, which grow to about one-half the size of the mother-cell before separating from the latter. Organisms in pairs of unequal size are more common than budding forms.

Mycelium has not been demonstrated in tissue or in the contents of the abscesses. In two cases organisms in the tissues were filled with small, globular bodies, which reacted to stains like spores, but no further development of these bodies could be seen.

In a systemic case, the author excised a small-bean-sized subcutaneous node, in which the epidermis was normal and the corium but slightly involved, the process being manifested chiefly in the subcutaneous tissue. The zones of infiltration were for the most part fairly well defined about dilated blood-vessels. The infiltration consisted of large numbers of the organism, also leukocytes, erythrocytes, connective-tissue, and plasma-, mast-, and giant-cells in varying numbers. In places there was a suggestion of tubercle-formation, in that the organisms, leukocytes, and red-blood cells were found chiefly in the centre of the node and surrounded by giant-, connective-tissue, and plasma-cells. In this and other systemic cases the organisms were very numerous and larger than those found in most of the cutaneous cases.

The organism is obtained easily in pure culture from the minute, deep-seated abscesses in the borders of the cutaneous lesions. Cultures taken from the larger abscesses and from teased tissue are contaminated often with pus-cocci or other bacteria. The blastomycetes have been obtained repeatedly, however, in pure culture from pus-abscesses of considerable size, showing that the organisms are in themselves pus-producing. In cultural features, the organisms from different cases have varied considerably, and it is possible that they will have to be classed in distinct botanic groups. On the other hand, individual organisms have been shown to vary greatly with the media employed and with other circumstances of culture, and the different types seen may be various stages of development of a single variety of fungus.¹ The organisms grow rapidly on most ordinary media, and though by varying the media and other circumstances of growth a given organism may be made to assume a variety of appearances, in most instances the type is that of a mould-fungus, showing on agar or glucose-agar a white, fluffy growth, with aërial hyphæ, and on glycerin-agar a pasty growth, with numerous folds and depressions.

Under the microscope, cultures show budding organisms and mycelium, that may be fine, homogeneous, and branching, or coarser, more or less segmented, and with or without lateral conidia. The mycelium may contain few or many highly refractive bodies, varying in size, which probably are spores. Mingled with the mycelium of older cultures are round, oval or irregular, double-contoured bodies, varying greatly in size, and more or less filled with highly refractive, globular bodies. These globular bodies, like those seen in the coarser mycelium, behave in every way toward reagents as spores do, but in no case have they been observed to develop into mature organisms. Under certain conditions, blastomycetes may develop by sporulation. Young

¹ Hamburger, Jour. Infect. Dis., 1907, iv, p. 201.

colonies and cultures on glucose-agar are made up of fine mycelium, with or without the presence of budding organisms. Older cultures and those on glycerin-agar show much coarser mycelium and a preponderance of the circular spore-containing bodies. A bit of old culture made up entirely of these round bodies, placed in a hanging drop of bouillon, develops in two or three days an abundant fine mycelium, in which the spore-like bodies are disseminated.

Though in tissues and in the abscesses the organism develops by budding only, fresh cultures from the abscesses show fine mycelium more frequently than budding forms. Animals inoculated with cultures composed of mycelium have developed abscesses from which budding forms only were obtained.

Inoculation tests have been largely unsuccessful, but in several instances subcutaneous injection of pure cultures of the blastomycetes has resulted in the production of a local abscess, or of an inflammatory granulation tissue, from which the fungus could be recovered. Intraperitoneal injections with the organism from a systemic case reported by Montgomery¹ were unusually successful. By inoculating the skin of animals with pure cultures of blastomycetes, Buschke succeeded in producing tumors which resembled closely the lesions of cutaneous blastomycosis in man. The organisms in several cases have been inoculated in animals, with the production of tubercular-like nodules, or other inflammatory areas, in the lungs, kidneys, and other organs, from which the fungus has been recovered and cultivated.

Diagnosis.—Though many of the cutaneous lesions of blastomycosis resemble verrucous tuberculosis so closely that a definite diagnosis can be established only after a microscopic examination of the tissue or of the contents of minute abscesses, lesions showing the typical border set with abscesses described above are so characteristic and are present so frequently that a positive clinical diagnosis is possible in most cases.

The readiest means of confirming the diagnosis is to place the contents of one or more of the abscesses, or a bit of teased tissue, between a slide and cover-glass with a drop of a 20 or 30 per cent. solution of potassium hydroxid. If distinct budding organisms are found, which resist the action of the alkali after the tissue and pus-cells have largely disintegrated (a change requiring from ten minutes to one hour), the diagnosis is practically established, but should be verified further by obtaining cultures of the organism and by histological examination of the tissue.

Other disorders to be excluded by a consideration of their characteristic features are lupus vulgaris and other tuberculosis of the skin, the rare vegetating forms of syphilis, and protozoan infection, which, it is now believed, may be a variant of blastomycosis.

Treatment.—Complete excision of the diseased areas has been practised successfully in several cases, no recurrence having been

¹ Jour. Cut. Dis., 1907, xxv, p. 393.

reported. Curetting, employed in a number of instances, has not prevented a return of the disease.

Large doses of potassium iodid, first employed by Bevan, arrest the progress of the disease and produces a marked improvement in the cutaneous lesions. From 200 to 400 grains a day have been required in some instances before any effect on the morbid growth has been produced. In some of our cases and in several reported by others the disease disappeared under this treatment. However, in the majority of patients treated with large doses of potassium iodid, though healing takes place rapidly over the greater portion of the area involved, small patches, usually of the verrucous border, remain for indefinite periods; and on the discontinuance of the potassium iodid the disease reappears with as great activity as before. In several of our patients who improved rapidly under the treatment up to a given point, the few remaining verrucous areas and abscesses disappeared after a few exposures to the *x*-rays. Pusey, Fischkin, and others have had good results from the combined use of potassium iodid and the *x*-rays.

More recently, Bevan¹ recommended copper sulphate, in $\frac{1}{4}$ grain (0.016) doses, internally, with a 1 per cent. solution of the same as a local wet dressing. Salvarsan was used successfully in three cases by Peterson,² and Harris³ also obtained great improvement in one case. Simpson⁴ records complete relief from symptoms with the use of radium. Gilchrist⁵ obtained improvement by using an autogenous filtrate from living organisms.

For most lesions, cleansing and antiseptic lotions or dry dressings may be used with advantage.

Prognosis.—Complete excision when practised has terminated the disease. Under the iodine therapy, the condition improves so decidedly that with the aid of the *x*-rays, or other local treatment, the disease should be eradicated completely. Recurrences, however, are common, even after the last clinical evidence except scars has been removed.

The prognosis in systemic cases is grave; the mortality in recorded cases is about 90 per cent.

PROTOZOAN AND COCCIDOIDAL INFECTIONS.

Protozoan and coccidoidal⁶ infections of the skin have been reported by Wernicke,⁷ Rixford and Gilchrist,⁸ Posadas, D. W. Montgomery,⁹

¹ Jour. Amer. Med. Assoc., November 11, 1905.

² Trans. XVIIth Internat. Cong. of Med., London, 1913, Sec. xiii, Part ii, p. 79.

³ Case demonstration, June, 1914, before the Chicago Dermatological Society.

⁴ Jour. Amer. Med. Assoc., 1914, lxii, p. 844.

⁵ Trans. XVIIth Internat. Cong. of Med. London, 1913, Section xiii, Part ii, p. 405.

⁶ For comparison between coccidoidal granuloma and systemic blastomycosis, see Arch. of Intern. Med., August, 1908.

⁷ Quoted by Gilchrist.

⁸ Johns Hopkins Hosp. Rep., 1896, vol. i (a full report of two cases and of the organisms, with illustrations).

⁹ Brit. Jour. Derm., 1900, xii, p. 343 (bibliography), and Jour. Cut. Dis., 1903, xxi, p. 5 (a new case).

Morrow,¹ and Ophuls and Moffit,² in which the cutaneous manifestations both clinically and histologically resembled very closely those of cutaneous blastomycosis. In the general symptoms, in the formation of subcutaneous abscesses, in the fatal termination, and in the larger size and greater number of organisms in the lesions, these cases correspond closely with those of systemic blastomycosis, with which they undoubtedly are closely allied. In cases of coccidoidal infection, the organism develops by endogenous spore-formation and never by budding; whereas in blastomycosis the only method of development of the organism in tissue is by budding. Though in at least two cases of the latter disease the organisms have contained what undoubtedly were endogenous spores, the development of these spores into mature bodies could not be demonstrated. The cultures obtained from cases of coccidoidal infection differ slightly from those obtained repeatedly in blastomycosis.

SPOROTRICHOSIS.³

In 1898, Schenck reported a case of "refractory subcutaneous abscesses caused by a fungus possibly related to sporotricha." The lesions here were multiple subcutaneous abscesses, occurring along the course of the lymphatics up the arms, and starting from a wound on the finger. The abscesses when opened were found to contain a gelatinous or aqueous fluid, and from this a sporothrix was isolated. In 1899, Brayton made a clinical report on an apparently similar case. In 1900, Hektoen and Perkins reported a similar case as to clinical symptoms and bacteriological findings to that recorded by Schenck. In 1903, De Beurmann published a case of the same type, under the title: "Multiple Subcutaneous Abscesses of Mycotic Origin." In this article he referred to the two proven American cases and the third clinical case. From 1906 on the disease was studied and reported

¹ Jour. Cut. Dis., 1903, xxi, p. 5.

² Philadelphia Med. Jour., June, 1900.

³ Schenck, Johns Hopkins Hosp. Bull., 1898, p. 286. Brayton, Indiana Med. Jour., 1899, p. 272. Hektoen and Perkins, Jour. Exper. Med., 1900, p. 77. Adamson, Brit. Jour. Derm., 1908, xx, p. 296 (case report and *résumé* of the literature relating to sporotrichial infections of the skin, with bibliography of cases reported up to that date). Hyde and Davis, Jour. Cut. Dis., July, 1910, xxviii, p. 321 (a report of a case observed by them; notes on another case furnished them by Zurawski; a short account of a group of probable cases of a similar nature occurring in North Dakota in 1904; a complete histological and bacteriological study, and a comparison of sporotrichosis with mycotic lymphangitis occurring in horses; and very full bibliography, covering the extensive reports of the French writers and others). Stelwagon, *ibid.*, p. 352. Pusey, *ibid.*, p. 352. Page, Frothingham and Paige, Jour. Amer. Med. Research, August, 1910, xxiii, No. 1, New Series No. 1, pp. 137-150 (a question of identity between the Sporotrichium Beurmannii and Sporotrichium Schenckii). Sutton, Jour. Amer. Med. Assoc., September 17, 1910, p. 1000; and *ibid.*, December 24, 1910, p. 2213. Hamburger, *ibid.*, 1912, lix, p. 1590 (sporotrichosis in man, with a summary of the cases reported in the United States, and a consideration of the clinical varieties and the important factors in the differential diagnosis). Chipman, Jour. Cut. Dis., 1912, xxx, p. 339 (a *résumé* of the views of De Beurmann and Gougerot on the subject of sporotrichosis). Wilder and McCullough, Jour. Amer. Med. Assoc., 1914, lxii, p. 1156: Sporotrichosis of the Eye (pertinent bibliography). Dermody and McMartin, *ibid.*, 1914, lxiii, p. 1028: A Case of Sporotrichosis. Sutton, *ibid.*, 1914, lxiii, p. 1153: Sporotrichosis in the Mississippi Basin (report on five new cases).

on by a large number of observers, chief among whom were De Beurmann and Gougerot in France. In America, in addition to the early reports above noted, Hyde and Davis, Stelwagon, Pusey, Sutton, Hamburger, Wilder and McCullough, and others have reported cases.

Definition.—The disease is characterized by the formation of indolent cutaneous and subcutaneous nodules, abscesses, and ulcers, not infrequently beginning in an infected wound, usually on the hand.

Symptoms.—The disorder may be initiated by a wound on the finger or other part of the hand, presenting various characteristics. It may be exhibited as a small nodule, or a superficial, inflammatory, open, discharging lesion. Occasionally, it may resemble to a certain extent the initial lesion of lues. At other times it may be insignificant and clear up before other manifestations occur. At a subsequent date, of varying length up to three months, nodules begin to appear upon the arm, along the course of the lymphatics. The lesions gradually enlarge, are painful, and may be seen varying in size from that of a pea to that of a mandarin orange. The smaller ones may be only recognized by palpation, when they are felt as hard, resistant growths in the subcutaneous tissue. After two or three months they become adherent to the skin, assume a reddish or violaceous tint, soften and break through the skin, discharging a grayish-yellow, homogeneous pus. The lesions then may gradually undergo involution or increase in size by new fistulous openings occurring around the original lesion. Incision into the lesions increases their growth rather than promotes resolution. Occasionally, the ulcer enlarges and takes on a fungus, papillomatous growth, producing a lesion closely resembling that seen in tuberculosis verrucosa cutis. The course of the lesions is indolent but progressive, and they may become disseminated irregularly over various parts of the limbs and trunk.

On account of the clinical resemblance to syphilis and tuberculosis, types have been described in France as syphiloid and tuberculoid. These types have been assumed in different stages in many cases. One case is reported as resembling lupus verrucosus, the lesions in this type occurring primarily on the face; another is reported in which a large abscess occurred, from which the sporothrix was isolated. The lymphatic glands are not attacked, and the general health of the patient is not interfered with by the disease, although tuberculosis has been recorded in association with the disorder and the sporothrix has been discovered in the sputum in a case where the lungs were found to be normal. In addition to the skin, the mucous membranes and bones have been invaded. In the former case, granulating ulcers have been described, which, however, have not produced the loss of tissue seen in ulcers similarly situated in cases of tuberculosis or syphilis. Sporotrichial gummata have been discovered beneath the periosteum, and a tibial periostitis has also been described. The muscular tissue has also been attacked with abscesses of a similar character.

Etiology and Pathology.—The disease is due to infection with the sporothrix fungus. As a rule, the organisms cannot be seen in sections nor in fresh pus from lesions in man. They are usually isolated either

by culture or by animal inoculation. In sections of tissue removed from infected animals they are readily demonstrated.

The organism is strictly aërobic and grows on ordinary media, but with greater profusion on media containing sugar. Cultures exhibit in the course of several days a delicate fringe, consisting of fine radiating lines, projecting at right angles from the margin of the growth. Later the surface of the growth becomes corrugated and the radiations at the margin more prominent. Their color early is dull gray or nearly white. Different appearances are noted, varying with the culture media employed. In hanging-drop preparations, branched mycelium, with oval spores attached singly by a pedicle or arranged in clusters or bouquet form, are seen. The mycelium is divided at irregular intervals by delicate septa, between which small, refractile granules occur. The spores vary in size and shape, measuring from 3 to 5 μ in length and from 2 to 3 μ in width. In sections from infected animals oval and oblong spores of varying size are noted.

That the organism is saprophytic is demonstrated by its growth upon various animal structures (caterpillars, fleas, and larvæ) and upon vegetables (lettuce leaves), and the suggestion is made that infection may take place through contact with unclean vegetables, or, from the same source, through the alimentary canal.

Sporotrichosis has been produced in a number of animals, including the horse, the cat, the mouse, the monkey, the rat, and the guinea-pig. In the latter animal the result of inoculation experiments is uncertain, this animal being least susceptible. The rat, on the other hand, is highly susceptible. The disorder has been thoroughly studied in the rat by De Beurmann, and in this animal implication of the viscera has occurred, a condition which has not been seen in man, but the pathological changes noted were similar in other respects. Sporotrichosis has been observed as a spontaneous disease in the horse, the mule, and the dog.

Several species of the sporothrix have been described in various parts of the world. Castellani and Chalmers¹ name eight, as follows: *Sp. Schencki*, *Sp. Beurmanni*, *Sp. Dori*, *Sp. Gougeroti*, *Sp. Jeanselmei*, *Sp. indicum*, *Sp. asteroïdes*, and *Sp. lesnei*. It appears that the organisms described by Schenck, Hektoen, and Perkins in America, De Beurmann in France, and Castellani in Ceylon, present sufficient differences to class them as separate species, though Castellani states that *Sp. indicum*, described by himself, may be only a variety of *Sp. Beurmanni*.

The microscopical findings in tissue have been described by De Beurmann and Gougerot as occurring in three types: a lympho-connective-tissue, or syphiloid type; an epithelioid with giant-cells, or tuberculoid type; and a polynuclear, or ecthymaform type. In Dr. Hyde's case the histology corresponded with the tuberculoid type. In this case the lesions were indolent, subcutaneous nodules and abscesses. There occurred a marked cellular infiltration, con-

¹ Tropical Medicine, 2d ed., 1913, p. 831.

sisting of round-, plasma-, epithelioid-, and giant-cells. In addition there were polynuclear leukocytes, but this section was taken from the edge of an ulcer. While the cellular composition was that of tuberculosis, the arrangement of the cells was not typical of the tubercle of that disorder.

Diagnosis.—The characteristic features outlined above, which include multiple cutaneous and subcutaneous nodules and ulcers of indolent character, the nodules being firm early, later softening and discharging a characteristic viscid, grayish-yellow pus; the arrangement of the lesions in a line up the arm; a past history of a primary infection wound; and the lack of interference with the patient's health, are all important points in diagnosis. While the lesions simulate fairly closely those seen in syphilis, tuberculosis, and occasionally blastomycosis, a differentiation can be made. In case of doubt, cultures should be made or animal-inoculation experiments performed. In the latter case pus or tissue inoculated into the perineal cavity of a rat produces a characteristic orchitis, in which the organism may be found abundantly. This corresponds with our previous experience with blastomycosis, which produces similar lesions in guinea-pigs. The cultural diagnostic method is preferable, owing to its more rapid development.

Treatment.—Potassium iodid is specific. With the administration of this drug the lesions rapidly clear up and the disease is entirely eradicated. The ulcers should be dressed in accordance with the principles laid down in surgery.

Prognosis.—The prognosis is good with the employment of proper treatment. It is not unlikely that cases of this type have been considered to be syphilis and been treated with potassium iodid, and on the patient making prompt recovery the diagnosis has been apparently verified.

DISEASES DUE TO ANIMAL PARASITES.

THE human skin may be attacked by animal parasites, which (a) habitually exist upon or within the integument, securing their nutrition in these situations; (b) exist upon the clothing, furniture, or other articles of environment of the body, attacking the latter only when in search of food; (c) are brought accidentally into contact with the human body and attack it when irritated or alarmed, without seeking nutriment; or (d) infest the vascular channels or viscera of the body and involve the skin only when approaching the surface as an accident of the human invasion.

PEDICULOSIS.

Synonyms.—Phthiriasis, Morbus Pediculosis, Lousiness. Fr. Phthirias; Maladie pédiculaire. Ger., Läuse-sucht.

PLATE XXXIV



Pediculosis.

Lice belong to the order *Rhynchota*, subdivision *Parasitæ*, family *Pediculidæ*. They are apterous, provided with two eyes, and have an oral appendage capable both of inflicting wounds and producing suction. The lice infesting the human body are recognized as belonging to three varieties: those of the head, of the body, and of the pubes. Of the disorders to which they give rise, it may be said, in general, that the lesions presented differ according to the region invaded, to the multiplicity of the intruders, and to the length of time during which their ravages have been inflicted. Such lesions, however, are those which have been already studied in connection with eczema, urticaria, and the similar disorders resulting from external irritation. Their special peculiarities in pediculosis are owing solely to the nature of the exciting cause and to the mode of its operation.

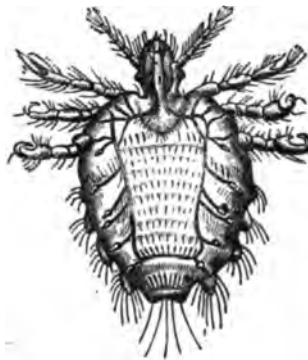
The head-louse (Fig. 258) is usually of a grayish color, but differs slightly with the hue of the hair on the part which it frequents. Its

FIG. 258



Pediculus capitis—male. (After Küchenmeister.)

FIG. 259



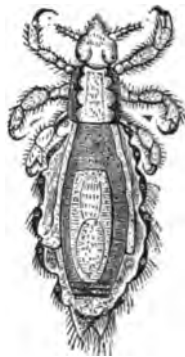
Pediculus pubis. (After Schmarda.)

head presents indistinctly the outline of a trefoil, and is provided with two hairy antennæ (each of five articulations) and two eyes. Its thorax is relatively narrow, with six tracheal stigmata and three hairy legs on either side, the legs being provided with tarsal hooklets. The abdomen is divided into seven segments, defined by blackish indentations on either side. The males are fewer and smaller than the females, and they present upon the dorsum an anogenital orifice and a large conoidal penis and testes. The females are provided with ovaries and with an anal aperture in the terminal abdominal segment. They measure from 1.2 to 3.2 mm. in length and are about one-half as broad as they are long. The body-louse closely resembles the head-louse, being, however, larger in size (1.2 to 4.2 mm. in length), the females also larger than the males. The thorax is separated from the abdomen, which is hairy, yellowish at the margins, and provided with eight segments. The eyes are black and very prominent in both sexes. In color the insects vary from a dirty-white to a light-grayish

hue, except when distended with blood, when they are dull-reddish or purplish in color, and more indolent in their movements.

The pubic louse (Fig. 259) is smaller than either of the above, measuring from 1 to 2.1 mm. in length and being nearly as broad as it is long. Its head is also attached more closely to its thorax, having a shape which is compared to that of a violin. The thorax is not distinctly separated from the abdomen, and of the six stout legs with which the louse is provided the second and third pairs are conspicuously powerful and armed with relatively large hooks at the tarsal extremity. The resemblance of the latter to the claws of a crab has given to this parasite the common name of "crab-louse." The lateral abdominal indentations are much less distinct than in the other varieties; and the blackish marginal marks of body-lice and head-lice are here scarcely apparent. The abdomen is less elongated, having a more rounded contour. The pubic louse is provided on its

FIG. 260



Pediculus corporis—female. (After Küchenmeister.)

lateral borders with eight short, conical feet, terminating in bristles. It is also distinguished from the others of its family by the length of its anal bristles and by the peculiar shield-shaped carapace which covers nearly one-half of the dorsum.

The ova or nits are whitish or grayish bodies of oval contour, that are glued to the hairs by a cylindriciform sheath of chitin, which completely incases the hair, the free, bulbous end projecting toward the free end of the hair. In the scalp they are deposited in series along the hair, being gradually removed from the scalp with the growth of the hair. The youngest are those nearest the scalp. A single female, according to Kaposi, can lay fifty eggs in six days, and thus in eight weeks have a progeny of five thousand lice. The ova of the *Pediculus corporis* are deposited in the clothing, fifty or more being deposited by each female pediculus; while in the pubic variety about twenty ova represent the reproductive power of each female parasite.

Pediculosis Capillitii (*Parasite, the Head-lice*).—Head-lice usually limit their habitat to the scalp, though rarely, in elderly men with long hair reaching to a full beard, they may encroach upon

the latter. They infest every portion of the scalp, but find the region of greatest protection upon the occiput. They are found upon children and adults of both sexes, but are furnished best with lodgment upon the scalps of girls and of women covered with long and luxuriant hair. The lesions observed upon a scalp thus inhabited vary according to the age and vigor of the colony and the irritability of the skin of the affected individual. They are few or numerous, discrete or confluent pustules or bullæ; the surfaces are excoriated by scratching and ooze with serum, pus or blood; the crusts vary in character according to the nature of the desiccated exudate and sebaceous matter. Often the picture presented is a conglomerate of an artificial eczema and a seborrhea.

The ova, or "nits," are usually abundant upon the hairs of an infested head, and will scarcely escape the attention of a close observer. They are not to be mistaken for the exfoliated epithelial and fatty plates seen in pityriasis steatoides disseminated among the hairs and often perforated by hairy filaments, since the former are glued firmly in position and resist the bristles of the hair-brush. The peculiarly nauseating odor of the louse-infested, pustule-, and crust-covered scalp is not to be confounded with that due to favus of the same region.

In aggravated cases the postcervical glands are enlarged in varying degrees by secondary infection. Multiple abscesses may occur in neglected cases.¹ The itching is usually severe, and in children, in cases of long persistence, may produce the usual systemic symptoms of prolonged local irritation. Children and patients of impoverished health and with poor hygienic surroundings are believed to exhibit the disease in severer grades than others; but this, if indeed a fact, must be due, at least in part, rather to the more favorable conditions for development and multiplication of the parasites that are presented by filth-accumulation and lack of cleanliness. In the public charities of large cities children affected with pediculosis capillitii are presented every week who come from the lowest social grades of the population and from the filthiest quarters. In these children it is not observed that the general health of the patients is a factor in the severity of the affection. In exceptional instances, the disease affects children and adults of high social grade.

Diagnosis.—The diagnosis of pediculosis capillitii is a matter of importance, however simple of accomplishment, since many cases of supposed "pustular eczema of the scalp" have vainly been treated by one physician with internal remedies addressed to the systemic vice supposed to be responsible for the disease, which another has relieved after the discovery of a few head-lice. The hairs should always be raised and separated, the scalp carefully inspected, and the presence of any parasites, and especially ova or "nits" fastened to the hairs, be ascertained. Whether the lice have preceded or followed the eczematous state (and each of these conditions may be noted), is a matter of minor importance. Pustules about the nares and lips,

¹ Schamberg, Jour. Cut. Dis., 1910, xxviii, p. 686.

especially of young girls, are often significant of pediculi of the occipital region, the lesions being due to picking and scratching the face under an impulse to relieve itching sensations of the scalp induced by the presence there of lice.

Treatment.—The indications in the treatment of pediculosis capillitii are the destruction of all parasites with their ova, and the relief of the induced inflammatory condition of the scalp. Generally, removal of the former is followed by spontaneous disappearance of the latter. For the destruction of the lice, the most popular remedy in the United States is petroleum (not kerosene), pure or with equal parts of balsam of Peru (which gives it an agreeable odor), poured over the scalp in quantity sufficient to cover it without overflow upon the brow, temples, and neck. It should be rubbed in with a piece of white (undyed) flannel. At the end of from twelve to twenty-four hours the lice are destroyed, and the ova are rendered incapable of development. This treatment is followed by a thorough shampoo with tincture of green soap, or with toilet-soap and hot water; after this operation the scalp may require a bland unguent, such as vaselin, or a small quantity of scented castor-oil, either pure or in combination with alcohol. Kaposi employs petroleum as a parasiticide in combination with olive-oil and balsam of Peru: 5 parts of the first, 2½ parts of the second, and 1 part of the third. Cutting the hair of women and children is unnecessary, as patience and gentleness with the use of the comb will disentangle the most matted masses after the lice have been destroyed. Other remedies are employed locally for a similar purpose, of which the most popular are staphysagria, 1 drachm (4.) of the powdered seeds to the ounce (30.) of vaselin, but especially in decoction; tincture of cocculus indicus; phenol in oil or water; sabadilla; the ethereal oils; and mercurials in ointment and solution, including the mercuric oleates. In cases in which but a few parasites have found their way to the scalp, and that recently, nothing more is requisite than careful use of a fine-tooth comb, scrubbing the scalp with a strongly scented alcoholic perfume, and final bathing with soap and hot water.

The ova adhering firmly to the hairs can be removed by soda or borax lotions, alcoholic solutions, or dilute acetic acid, which are solvents for the gluey material by which the "nits" are secured in place.

Pediculosis Corporis (*Pediculosis Vestimenti*, *Phthiriasis*, *Parasite, the Body-louse*).—The parasites in this disorder inhabit exclusively the clothing worn next the body.

They may be found in the seams of undergarments, where their ova are also deposited; but in coarse woollen or flannel shirts they find sufficient shelter in the meshes of the material of which the clothing is made. This they leave temporarily, solely for the purpose of obtaining nutriment from the skin of their host, and hence are not recognized upon the free surface of the integument. Upon rapid removal of the clothing of an infested individual, a few lice may occasionally be encountered hastily seeking a place of refuge, though this is rather the

exception to the rule. It thus may happen that a louse-bitten patient will not exhibit the source of his trouble to his physician after a recent and complete change of clothing. The greater, then, is the importance of being able to recognize the clinical features of the malady in the absence of the parasite. This recognition is comparatively easy to one who has made himself familiar with the symptoms of the disorder.

Swammerdam's original view that the louse is not provided with mandibles by which it can inflict a wound, but with a *haustellum*, by which the blood is sucked up to the head of the parasite, is confirmed by Schjödte. The invaded follicle, after the withdrawal of the *haustellum*, becomes the seat of a circumscribed hemorrhage. This hemorrhagic spot, which is level with the skin, is the characteristic lesion of the disorder. The remainder of the cutaneous lesions are all the result of trauma induced by the intense itching accompanying the disease.

Excoriations, usually linear, occasionally circumscribed, varying in depth and length, radiate irregularly from each louse-wound, and they may be commingled with minute papules, transitory wheals, or, in rare, aggravated cases, with the typical signs of diffuse eczema. Crusts, often composed of desiccated blood, rarely of serum or pus, minute and capping the wounded follicle, or linear and coextensive with the excoriations produced by scratching, are generally conspicuous. In older cases these lesions are followed by the usual sequel, pigmentation, the latter being a partial indication of lousiness which has long been tolerated.

In America it is rare to note the severe and intense forms of the malady, resulting from long-continued neglect of the skin, that occur in Germany. In these cases follow dermatitis, rupioid crusts, furuncles, abscesses, carbuncles, and ulcers, resulting in serious implication of the skin, which may persist for weeks after the clothing has been freed from lice, and finally leave a deep-tinted, diffuse pigmentation of the skin-surface, suggesting that of the negro or of the patient affected with Addison's disease, and in certain of these the mucous membranes of the mouth may show pigmentation. In certain cases found among inmates of poorhouses and low-grade lodging-houses, the skin infested with pediculi becomes densely indurated, harsh, dry, and deeply pigmented in consequence of much scratching and total lack of care of the person; and to this type the term *ragabond's disease* has been applied. Cases are recorded also in which varying degrees of fever have attended the disorder, due to the cutaneous irritation induced by the parasites, and not to secondary infection, as the latter has not been of consequence in these cases.¹ Payne accounts for this through a poisoning produced, rather than irritation induced, by the parasites.

Diagnosis.—The diagnosis is a matter of importance. Patients will visit physicians claiming that they have suffered from a "humor of the blood," who have been swallowing drugs for a long period of time,

¹ Jamieson, Brit. Jour. Derm., 1889, i, p. 321; and Payne, *ibid.*, 1890, ii, p. 209.

in the vain hope of obtaining relief, with lice, at the very moment of uttering the complaint, crawling over their persons. Even those of good social position and cleanly habits will occasionally suffer after accidental contact with persons having the parasites. There are certain points to be carefully noted in this connection. Excoriations over the nucha, about the shoulders, loins, buttocks, and external faces of the thighs, all visible at the same time, are highly suspicious symptoms; as an eczema, when equally diffuse, is sure to be accompanied at some point by perfectly classical features; and generalized pruritus is exceedingly rare, its localized varieties concerning chiefly the regions about the mucous outlets of the body. There is a picture highly suggestive of pediculosis presented when the trunk of an infested patient is viewed from behind. The lesions are more discrete, more irregularly distributed, and more intermingled with long scratch-marks (reaching, for example, quite over the point of one shoulder) than in most disorders with which pediculosis vestimenti could be confounded. Here and there minute blood-specks tell a significant tale.

In private practice it is usually advisable, for obvious reasons, to secure the *corpus delicti* before informing the sufferer of the nature of the condition. In the case of male patients, it is well to take a position in the rear, and when the underclothing is drawn well up from the shoulders a careful scrutiny of it may be made while the applicant for relief supposes that attention is directed instead to his body.

Treatment.—The treatment of the disorder concerns largely the clothing. The latter requires immersion in boiling water, or it may be wrapped in paper, placed in an oven and subjected to a temperature sufficient to destroy the lice and their ova (160°–175° F.). In case of recurrence of the malady, the clothing is to be again subjected to the same process. Usually the irritation of the skin resulting from the invasion promptly subsides. When several members of one family suffer, all clothing worn must be so treated. If the skin has been unusually tormented by scratching, warm alkaline baths will afford some comfort, and they may be followed by a bland unguent or by one of the dusting-powders. For immediate use, before the clothing can be rid of the intruders, a small cheesecloth bag containing sulphur in stick or in powder may be worn beneath the underclothing, or the powder may be dusted in the clothing and rubbed over the body. A parasiticide ointment may be ordered, as recommended by Duh-ring, prepared by adding 2 drachms (8.) of freshly powdered staphysagria to the ounce (30.) of hot lard, strained and cooled.

Pediculosis Pubis (*Crab-louse, Parasite, the Pubic Louse. Fr., Morpion*).—In this disorder, the genital region is chiefly involved, though in exceptional cases all the hairy portions of the skin may be invaded, including the eyebrows, the eyelashes, the axillæ, and the moustache and beard, the hairy chest, and the hairy legs of men.

The pubic louse is much more inactive than the others, and does not ordinarily escape its pursuer. It buries its head deeply in a follicular orifice, and steadies itself in this position, where it may remain

for some time, by grasping the adjacent hairs with its short and powerful claws. A moderate degree of force is required for its dislodgment from this favorite position, and when removed its grasp of the hair to which it clings is so firm that the latter usually slides for its entire length through the claw of the louse. Occasionally, it may be found creeping over the skin or clinging to hairs at a distance from the skin-surface. The pyriform ova are smaller and fewer than those of the head-lice, though having a similar color, and are, like the latter, attached to the hairs by a firm, chitinous glue.

Pubic lice are usually acquired during the contacts incidental to the sexual act; and hence are more frequently encountered among adults; but may, without question, be transmitted mediately by occupation of beds and clothing which have been used by infested persons. They are thus, though rarely, found in children of both sexes.

The lesions induced are those produced by the wounds inflicted by the parasites and by constant scratching, though these are rarely severe. In a few cases a severe dermatitis follows the ravages of the lice, but in such event the complication is chiefly owing to unnecessarily severe self-treatment of the disorder, patients being often morbidly anxious in their efforts to rid themselves of the parasites.

In certain cases of pediculosis pubis a peculiar pigmentation occurs, described as *Maculæ ceruleæ* (Fr., *Taches ombrées*, *Taches bleuâtres*), which are pea- to small-coin-sized, grayish stains found on the chest, abdomen, thighs, and upper arms, especially of blond subjects. They have a steel-gray tint, do not disappear under pressure, and are believed to be, for the most part, signs of infestation with the pubic louse. Duguet,¹ after inoculations with the juices of crushed pediculi, believes he has demonstrated that the lesions spring from pigment originating in the body of the insect. Jamieson² considers these pathognomonic of the presence of the pediculus pubis.

Occasionally, the parasites attack the eyelashes (*Phthiriasis palpebrarum*), especially in children, where they produce a condition resembling a blepharitis ciliaris or eczema.³ The borders of the lids present what appear to be small, dark crusts, which on careful examination prove to be pediculi closely attached to the ciliary margins, with their heads deeply imbedded in the hair-follicles.

Diagnosis.—The diagnosis of pediculosis pubis is between eczema and pruritus genitalium. The disease last named is in both sexes accompanied by itching, and that often of intense grade; but when this is diffuse and symmetrical in distribution it is not limited particularly to the hairy parts. Eczema of the genitals is not often produced by parasites of that region, and it may readily be recognized by its characteristic features. Both disorders are often, indeed, limited to symmetrical patches upon the side of the scrotum or one labium. The discovery of the parasite, however, in pediculosis pubis

¹ Annales, 1880, p. 544.

² Loc. cit.

³ Winfield, Jour. Cut. Dis., 1889, vii, p. 332 (recording 4 cases).

is always essential, and requires merely careful inspection and a good light. The lice may be recognized either at or near the point of implantation of the hairs, which also display ova, except in very recently infested individuals. The reddish excrement of the parasites, mingled with scratch-marks and excoriated papules of small size, may also be observed. Patients are often made aware of their condition by a sensation of crawling over the parts. Scratching of the pubic region in adults of both sexes should awaken suspicion of the disorder.

Treatment.—The disorder is treated commonly by the topical application of mercurial ointment, which is a disagreeable and rather filthy medicament for this locality. The 10 per cent. oleate may be substituted for it, or even, preferably, mercuric chlorid in solution. from 3 to 4 grains (0.2–0.268) to the ounce (30.). Petroleum and olive-oil, with balsam of Peru, in the proportions given above in connection with the subject of pediculosis capillitii, furnish an effective combination. Staphysagria, phenol, cocculus indicus, or one of the other substances used in the disorders occasioned by the animal-parasites, may be substituted if desired. It is usually better to defer bathing until the remedy selected for the destruction of the lice has been applied on several occasions, after which a warm soap-and-water ablution will commonly end the trouble. It is needless to clip the pubic hair. Should a dermatitis follow, an appropriate treatment includes hot bathing and the blander lotions and unguents.

CIMEX LECTULARIUS.

Synonyms.—Bugs, Bedbugs, *Acanthia Lectularia*. Fr., Punaise des Lits; Ger., Bettwanze.

Strictly speaking, the bedbug is not a parasite of man, but finds its congenial habitat in the bed, bedding, and bed-covering, and the walls and floors of apartments occupied by persons of both sexes and all ages. It may find a host in certain of the lower animals, such as the guinea-pig. It infests also furniture, including chairs, sofas, and the cushions of seats occupied in public vehicles and hotels. From the cracks, crevices, seams, folds, or other protected points, where it has found lodgment, it emerges, usually at night, for the purpose of securing its nutriment in the blood of its victims.

This insect is an apterous member of the order *Cimicidæ*, and has a rusty or reddish color, this differing slightly according as it is or is not distended with blood. It is provided with a blunt-pointed head, broadly attached to the thorax; two long, slender antennæ; and a three-jointed haustellum, capable of projection and retraction, beneath the head. There are three pairs of long, slender legs, by which it is enabled to accomplish rapid movements. The abdomen is broad, flattened, and oval in shape, with nine segments. The parasite emits a disgusting odor, which is much more distinct when it is crushed.

The wound inflicted by this bug is accomplished with or without the consciousness of its victim, who in the former case is made aware of a transitory prick or sting. Soon after, decidedly itching, burning.

or stinging sensations are experienced, and the wound becomes the seat of an urticarial wheal. The lesion, when examined soon after the infliction of the wound, is seen to be a small- pea- to bean-sized, elevated and circumscribed "button" or papulo-tubercle, either uniformly red or presenting a whitish centre surrounded by a zone of hyperemia. After the lesion has begun to subside and lose its acute features, which may not occur for several hours if it be irritated by rubbing or scratching, a minute, reddish punctum may be seen marking the original site of the wound.

The lesions are usually multiple, even when but a single parasite has been present, the insect obtaining its nutriment from several distinct points upon the surface. In this way, at times, its course upon the integument may be traced for a short distance. In cases in which the pests are numerous, as in filthy dwellings, prisons, ships, and barracks, and when infants have been attacked, the resulting eruption is often greatly masked by the scratching and resulting excoriations of the skin-surface. Associated lesions are vesicles, pustules, crusts, purpuric blotches, and even infiltrations.

Diagnosis.—The diagnosis is a matter of importance, and upon it may hang a professional reputation. Physicians are often consulted respecting these lesions by patients who believe themselves to be suffering from "hives," "humors," exanthemata, and even from syphilis. The insect attacks the parts of the body to which access is easy as the patient sits or reclines; namely, the legs about the ankles, the buttocks, the shoulders and the neck. The eruption is not to be confounded with urticaria *ab ingestis*, which is more apt to be symmetrical in disposition.

Treatment.—The eruption is best relieved by the topical application of spirit of camphor, alcohol, weak carbolated lotions, or solutions of boric acid, 1 drachm to the pint (4. to 500.). Untreated, it disappears spontaneously when the source of the disorder is removed. The most effective treatment is by prophylaxis, with soap, corrosive-sublimate solutions in alcohol, and hot water employed over all accessories of the dwelling-house inhabited by the insects. Once discovered to be present, infested furniture should be scrubbed and all its crevices treated with a strong solution of corrosive sublimate in water and the bed-clothing be immersed in boiling water.

GRAIN ITCH.¹

Synonyms.—Acarodermatitis Urticarioides (Schamberg), Straw Itch, Barley Itch.

¹ Schamberg, Jour. Cut. Dis., 1910, xxviii, p. 67 (In this article, from which the description used in this text was largely taken, the author reviews his early work, describes the disease in detail, and gives a critical and thorough review of the literature). Rawles, Indiana State Med. Jour., August, 1909: Straw Itch. Wills, Brit. Jour. Derm., 1909, xxi, p. 249: Barley Itch (The causative organism was not discovered by this author in his cases). Goldberger and Schamberg, Public Health Reports, U. S. Public Health and Marine Hospital Service, vol. xxiv, No. 28, p. 1909: Epidemic of an Urticarioid Dermatitis Due to a Small Mite (*Pediculoides Ventricosus*) in the Straw of Mattresses.

This disorder was first described in this country by Schamberg,¹ in 1901. It has since been recognized, in addition to Philadelphia and the region about it, in Indiana, Ohio, and other States.

Symptoms.—The disorder is characterized by an eruption consisting of wheals, exhibiting a central pinpoint-sized vesicle. Schamberg states that this is the peculiar lesion of the disease, and is so characteristic as to suggest immediately the affection. The contents of the vesicle are clear for a brief period, and then become lactescent or distinctly puriform, constituting a well-marked pustule. Instead of wheals, the efflorescence may consist of slightly elevated, erythematous-urticarial spots, or papulo-urticarial lesions.

The lesions vary in size from that of a lentil to that of the fingernail, and are rounded, oval, or irregular in shape. They are edematous, like the wheals of ordinary urticaria, and not infrequently elevated from 1 to 2 mm. above the level of the surrounding skin. The color is usually a rose tint; only rarely is seen the pinkish-white, anemic area which occurs in ordinary urticaria. The central vesicle or pustule, which is usually minute, may in certain cases reach the diameter of 3 mm. In such cases the large vesicles situated upon an erythematous-urticarial base present a strong resemblance to the lesions of smallpox. In many patients, through excoriation, the lesions are greatly altered, and those of traumatic dermatitis supplement the ones above described.

The eruption is usually profuse, and involves the neck, chest, abdomen, and back, and in lesser degree the arms and legs, the greater number of lesions being on the trunk. The face is often free, although at times scattered lesions may be present. The hands and feet are nearly always exempt. The extent of the eruption and the size of the individual lesions are apt to bear an inverse relation to each other. In rare instances, the eruption may resemble that of multiform erythema. It is accompanied by intense itching, which is worse at night and seriously interferes with sleep. As in most other itching disorders, the trauma inflicted by the nails induces secondary pyogenic infection and other lesions of this type. The disease may be accompanied by mild constitutional symptoms, the temperature being elevated from one-half to three or four degrees. A certain degree of malaise and anorexia may also be present, but in many patients no systemic symptoms are exhibited. A moderate leukocytosis and eosinophilia were found by Schamberg in a large number of cases examined.

Etiology.—The disorder is produced by a mite termed *Pediculoides ventricosus*, which is found most commonly in straw. The disease occurs in epidemic form, usually between the months of May and October. Several members of a household or groups of laborers or sailors may be simultaneously attacked. It may occur at any age, the necessary factor being contact with grain or straw infected with the mite. Schamberg and Goldberger, in their original investigations in Philadelphia, traced the infection to the use of new straw

¹ Phila. Med. Jour., July 6, 1901.

mattresses. It was eventually discovered that all of these had been made by one manufacturer, who used straw from a certain county. The organisms were found in the dust and siftings from the straw.

Pathology.—The histopathology described by Schamberg, taken from a vesico-pustule situated on an urticarial base, is as follows: Over the region of the vesico-pustule there is circumscribed elevation of the epidermis. The stratum corneum is reduced to one or two layers, and the stratum granulosum is absent. Two layers of fusiform rete-cells extend from the lateral portion of the roof of the whole vesicle toward the middle, but are lost over the central area. No vertical cleavage was noted in the centre suggestive of a puncture by a parasite, nor was any parasitic appendage noted anywhere in the skin. Beneath the altered rete, large numbers of leukocytes were noted. The blood-vessels and lymph-spaces showed much dilatation. In the corium a dense, circumscribed, cellular infiltration was present. This infiltration consisted of round cells, a considerable number of polymorphonuclear leukocytes, and in the middle and deeper portion of the corium large numbers of mast-cells. There were marked dilatation of the vessels and edema. Fragmentation of the leukocytic nuclei was noted to a limited degree. The pathological changes were essentially those of an urticarial lesion.

The *Pediculoides ventricosus* belongs to the class of *Arachnida*, order *Acarina*, family *Tarsonemidae*, and genus *Pediculoides*. The parasite is described as follows: "Normal and free rostrum; legs of the fourth pair in the female of the same dimensions as the others, terminated by two nails and a sucker; legs of the first pair in the female normal, terminated by a claw; legs of the fourth pair in the male but little different in dimensions from the others, terminated by a claw. Dorsal plaque segmented. Abdomen of the gravid female swells up into a sort of sphere. The last anatomical characteristic is the most striking of those possessed by the genus. The female is ovoviviparous and gives birth to small octopods, which can be fecundated immediately. It is possible that the *Pediculoides* parasites upon man do not belong to a single species." These parasites are said to be of economical importance, for the reason that they are inimical to the grain insects, and therefore favor the preservation of that cereal. They are parasitic upon the larvæ of soft-bodied insects, which are usually grain-destroying parasites.

Unlike the *Acarus scabiei*, the mite *Pediculoides* does not burrow into the skin. Microscopic examination of vesicles and pustules has demonstrated the absence of the mite or any part of it beneath the surface of the skin. Schamberg states that it is probable that in the process of extracting liquid nourishment from the skin the mite synchronously injects an irritating substance, which gives rise to the lesion.

Diagnosis.—The affection is to be differentiated from urticaria, chicken-pox, and scabies. The longer duration of the individual lesions, the accompanying vesiculation, the constitutional disturbance,

the greater persistence of the attack, and the occurrence of the disorder in groups of persons, distinguish it from urticaria. From chicken-pox it is distinguished by its occurrence largely in adults, the presence of intense itching, and the difference in the character of the vesicles. From scabies it is differentiated by the location of the lesions and by their individual characteristics. The absence of lesions on the hands and the presence of urticarial and erythematous-urticarial lesions also distinguish it from scabies. A history of contact with straw is of great diagnostic value.

Treatment.—As the *Pediculoides* does not burrow beneath the skin, it is a comparatively simple matter to rid the patient of the parasite. Frequent warm baths are recommended, and Schamberg suggests the use of the following ointment: beta-naphthol, grains 30 (2.); sulphur precipitate, grains 40 (2.66); adipis benzoat, 1 ounce (30.). In order to prevent reinfection of the patient, his clothing should be disinfected either by boiling or careful fumigation with sulphur or formaldehyd. When the source of the parasite is a straw mattress, the latter may be rendered free of the mites by exposure in a closed chamber to steam, sulphur fumes, or formaldehyd. Ordinarily, the itching will subside in from twelve to thirty-six hours, and the eruption will disappear within a week or ten days. When the cause of the eruption has not been recognized and the use of the mattress has continued, patients have been known to suffer for periods varying from three to seven weeks.

Prognosis.—The disease tends to spontaneous disappearance in time. It may be prolonged by reinfection, but when recognized and appropriate treatment instituted recovery takes place in from one to two weeks.

COPRA ITCH.¹

This disorder is described as occurring in Ceylon, in people working in copra mills, and presents an eruption resembling scabies, but without burrows or cunicula. The lesions are found on the hands, arms, and legs, sometimes on the whole body except the face. They are fairly numerous, itch extremely, and may consist of papules, papulo-pustules, pustules, crusts, and excoriations. The eruption begins on the hands and spreads to the arms, legs, and trunk. There is no tendency to clear spontaneously as long as the patient continues at his work.

Etiology.—The disorder is produced by the *Tyroglyphus longior* Gerv., var. *Castellani* (Hirst). This mite produces a dermatitis in the same manner as the *Pediculoides ventricosus*. A large number of the organisms may be found in the dust of the copra mills. Castellani suggests for treatment beta-naphthol ointment, 5 to 10 per cent. The organism described by Hirst² resembles the *Acarus scabiei* in a general way.

¹ Castellani, Brit. Jour. Derm., 1913, xxv, p. 19.

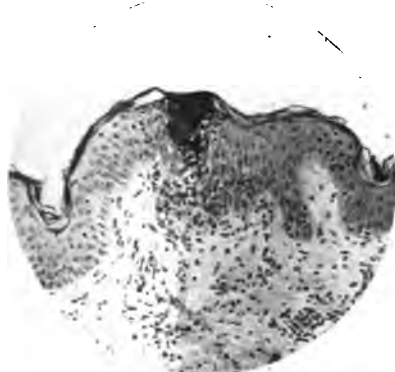
² Ibid., p. 21.

BROWN-TAIL MOTH.

In some of the New England States, notably Massachusetts, New Hampshire, and Maine, an exceedingly annoying dermatitis has for several years been recognized as the result of the introduction of the *Porthesia* (or *Liparis*) *chrysorrhea* (the brown-tail moth) into certain districts. More recently, the recognition of the disease elsewhere, even in some of the Western States, has attracted special attention to its etiology and pathology.¹

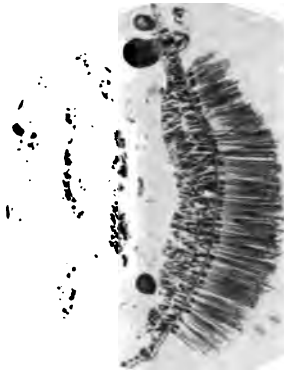
Symptoms.—The reaction of the human skin to the “nettling hairs” of the moth varies greatly in different conditions and with different individuals. In general, there is produced within twenty minutes after contact a more or less severe itching, followed by an urticarial wheal, the dimensions of which for the most part correspond to the area of

FIG. 261



Section showing inflammatory changes in the corium twenty-four hours after the skin had been rubbed lightly with a small brown-tail caterpillar. (Tyzzer.)

FIG. 262



Section of a caterpillar showing the nettling hairs as they are developed upon its skin. (Tyzzer.)

inoculation. When the offending caterpillar is crushed on the human skin, a more or less severe dermatitis results. When infected clothing is worn, a diffuse urticarial rash may follow, or minute, discrete papules or vesico-papules of the same size may develop. The eruptive symptoms most often occur when the caterpillars are maturing, in the months of May and June; but the lesions may be seen earlier or later, and even at any season of the year, as the result of incautious wearing of infected clothing.

Etiology and Pathology.—Tyzzer has demonstrated that the disease in man is produced by penetration of the epiderm, and even of the

¹ Tyzzer, Jour. of Med. Research, 1907, xvi, p. 43; also, by the same author, VI Internat. Cong. Derm., New York, 1907 (full bibliography and illustration of “nettling hairs” embedded in corpuscles of mammalia); White, J. C., Boston Med. and Surg. Jour., 1901, cxliv, p. 599; Meek, E. K., ibid., p. 657; Fernald and Kirkland, Bull. Massachusetts State Board of Agriculture, 1903.

corium, by sharply pointed, barbed "nettling hairs," developed on the caterpillar or the moth, but found also on cocoons, ova, and imagoes. These filaments are barbed for their entire length and average 0.1 mm. in length, and 0.004 to 0.005 in width. They possess a thin, chitinous wall, with a finely granular material filling the shaft.

The barbs of the moth do not produce the resulting dermatitis solely as a consequence of the mechanical irritation set up by their presence, but they possess in addition an irritating substance of a chemical nature, demonstrated clearly by the reaction it is capable of inducing in red-blood corpuscles. The pathological process in the skin consists of a necrosis of the epidermal cells around the foreign body. Similar reactive effects have been produced after artificial infection of mice.

FIG. 263



A sketch showing the effect of the nettling hairs of the brown-tail moth upon mammalian red-blood corpuscles. (Tyzzer.)

Treatment.—The treatment is unsatisfactory, in consequence of the actual penetration of the barbs into the integument. Soothing lotions and salves are often ineffectual. Excision of the barbs, when these can be recognized, has been found effective.

PULEX IRRITANS.

Synonyms.—Flea. Fr., Puce Commune; Ger., Gemeiner Floh.

Fleas exist in all parts of the world, the pest which especially attacks man living in dwellings as well as out of doors, infesting crevices in floors, walls, and even the clothing. Fleas belong to the order of *Diptera*, family *Aphaniptera*. The males are 2 to 2.5 mm. in length, and the females about 4 mm. The insects are reddish-

brown in hue, and are provided with a head having no bristles; these, however, well projected backward, mark its thoracic and abdominal rings. The eggs are white and barrel-shaped, and are deposited in the crevices inhabited by the mature insects as well as on the clothing of men. The legless larvæ, having fourteen segments, are changed to pupæ in eleven days.

The flea which specially attacks man has a laterally compressed body; an oral haustellum; serrated, soft mandibles; a tongue sheathed in an inferior labium; and a pair of labial, four-jointed palpi. Each of the triple segments of the thorax bears a pair of five-jointed, double-clawed legs. The nympha is enfolded in a cocoon, but only the mature insects prey upon man.

According to Geber, the insect injects an irritating fluid into the skin at the moment of attack. It attacks the human skin for the purpose of securing its blood-food. The lesion it produces is a hemorrhagic punctum, followed by a transitory hyperemia and a hemorrhagic exudation, which may persist for a few hours. When the pests are numerous, the resulting distress is considerable. The wounds are recognized by a central punctum, with an areola of reddish or purplish hue. This central punctum or point distinguishes the wounds produced by the insect from macules of simple erythema; but care should be taken, when fever is present, to exclude the symptomatic erythemata.

The site of the wound may become an urticarial wheal, and other urticarial lesions are produced in sensitive skins by the effort to relieve the itching produced by the bites of the insects. In severe cases the nervous system is harassed to a grave point by the resulting discomfort. The petechial character of the cutaneous lesions is often well marked.

It is important to identify flea-bites on the skins of patients suspected of being the victims of typhus or other fevers; and of filthy subjects who are affected with other skin-disorders.

Mixed cases of flea-bites with wounds produced by bugs and lice are often seen in the lowest classes applying to public charities for relief; and the deeply pigmented skins they exhibit, often with purpuric lesions distributed over the lower extremities, and commingled with syphilitic eruptions, are in the highest degree confusing. The practitioner should always be on his guard in pronouncing on these cases, especially if the purpuric blotches occur in the cachectic or in those suffering from other diseases than those of the skin.

The fleas of the lower animals occasionally are transferred to the human body, but rarely thrive on such a host.

Treatment.—The treatment of flea-bites is by carbolized, alkaline, and tarry lotions, and other local applications suggested in the treatment of urticaria. Stelwagon¹ recommends the wearing of bags filled with gum-camphor or pyrethrum beneath the clothing. Sulphur has been employed similarly.

¹ Dis. of the Skin, 7th ed., p. 1187.

IXODES.

Synonyms.—Wood-tick. Fr., Pou de Bois, Tique; Ger., Holzbock.

Several species of tick are recognized, such as the *Rhipicephalus annulatus* (cattle-tick), *Amblyomma americanus*, *Ixodes unipunctatus*, and *Ixodes ricinus* (wood-beetle), the last named being more common in Europe. In America wood-ticks are found in wooded districts, especially where pine- and fir-trees are growing. The female occasionally attacks the human skin by thrusting into it her beak, armed on either side with a maxillo-labial projection having recurved hooklets. The mandibles also present similar obstacles to the forcible extraction of the head. After suction of the blood from the wound, the body of the tick swells to the size of that of a pea or small bean, and may remain for several days in the same position. At such times the parasite may be mistaken for a small, pedunculated tumor. Forcible attempts at extraction of the intruder are liable to detach the mandibles from the body, and thus leave them in the skin, to become the source of future irritation and even disagreeable inflammatory symptoms in the site of the punctured wound. On applying over the tick a drop of spirit of turpentine or benzin, the head is spontaneously retracted and the body falls from its position. Soldiers on the plains of the United States accomplish the same end with the juice of tobacco. The sensation produced at the moment of the insertion of the beak of the insect is said to be so trifling as often to pass unnoticed.

Other insects may persistently or occasionally attack the human skin: gnats, mosquitoes (*Culicidæ*), midges (*chironomidæ*), bees (*Apes mellificæ*), and wasps (*Vespidæ*). They produce by their bites or stings various cutaneous lesions, including urticarial wheals, papules, ecchymoses, and in rare cases even ecchymomata. The lesions produced by the midge, like those of the mosquito, are seen on the face, the hands, and exposed parts; though, when numerous and voracious, these insects will penetrate the clothing for the purpose of obtaining blood. In America severe eruptive lesions are often seen on the faces and extremities of infants and children exposed during the night to the incursions of these marauders.

Immigrants newly arrived during the summer season in America from countries where the mosquito is either rare or does not exist often present singular and even formidable evidences of the attacks of these insects. The skin, unaccustomed to such depredations and quite unprotected, will often be found greatly swollen, and of a light-reddish hue, suggestive of erysipelas. Here and there bullæ are conspicuous, which add to the resemblance to the last-named disease. The features, in consequence of the tumefaction, vesiculation, and papulation, may be so swollen as to present a conspicuous deformity; and the forearms, and even the arms, seem greatly increased in size from the same cause. The feet and legs also may, in the unconsciousness of sleep, be exposed in hot weather to the depredations of these marauders, and in the same way the back, the buttocks, and, rarely,

even the genitalia, may present the same signs of inflammation. The matter of chief moment is the correct diagnosis of such cases, as many patients seeking relief under such circumstances have been treated for disorders with which they were not affected.

Treatment.—For the bite or sting, aqua ammoniæ or spirit of camphor may be employed. For subsequent lesions, soothing lotions, such as the zinc oxid and lime-water or calamine lotion, are useful.

SCABIES.

Synonyms.—"The Itch." Fr., Gale; Ger., Krätze.

Definition.—Scabies is a contagious cutaneous affection, produced by the *Acarus scabiei*, characterized by intense itching, with nocturnal aggravation, and in which multiform lesions (vesicles, papules, pustules, excoriations, and crusts) occur, especially on the hands (particularly the interdigital spaces), about the wrists, the axillary folds, the abdomen, the genitals, and the upper thighs.

Symptoms.—Scabies is a disease of polymorphic symptoms, which may be viewed as an artificial dermatitis, produced by the invasion of the itch-mite. The objective symptoms differ according to the extent to which the skin is primarily invaded by the parasite, or is secondarily injured by traumatism and severe scratching of its surface.

Prominent among the objective symptoms is the cuniculus or acarian furrow, an elongated gallery excavated in the epidermis by the female acarus. This cuniculus or furrow is a whitish or yellowish, slightly arciform, linear lesion, with regular parallel borders covered with dots or specks of blackish aspect, representing feces of the mite. It resembles a beaded, dotted, yellowish or blackish thread, the color being more pronounced in comparison with a fresh-colored and washed skin, and less marked in contrast with a soiled surface. Particles of dirt may be commingled, emphasizing the location of the furrow. The cuniculus may be curved, angular, or tortuous, and terminates at the upper extremity by a vesicle, pustule, or exfoliation of the surface at the site of an infundibuliform depression, and at the deeper extremity by a whitish or yellowish, shining, and salient point, representing always the acarus. The "head" of the gallery, where the parasite first entered the skin, is usually whitish, and is more elevated than the "tail," where the acarus rests after laying its dozen or more eggs. At times the entire cuniculus forms an elevated ridge, rather than a thread-like depression, with white dots along its summit. When the roof of the vesicle at the head is torn off by scratching, the effect is to produce a reddened spot at its site, surrounded by a whitish moat running around the entrance of the gallery. Occasionally, the cuniculus may be nearly completely covered by a bulla, pustule, or vesicle extending its entire length. In these cases, however, the acarus always penetrates beyond the peripheral wall of such lesion, working her gallery beyond it and more deeply. The female acarus may be recognized at the terminal extremity of her gallery, for it is

now known that she does not in her lifetime leave it for any purpose, as was at one time thought. It is important to know that this parasite may be recognized by the unaided eye. Its characteristic tortoise-

FIG. 264



Acarian furrow, from the lumbar region. The female acarus is visible at the terminal extremity of the furrow, with ventral surface exposed, and containing a mature ovum; two ova, next her, have been laid during the day; the third exhibits traces of the embryo; the twelfth exhibits a mature larva (*a*); twelve empty shells are also seen; between these feces are represented by black points. (After Kuposi.)

like body exhibits most of its anatomical peculiarities under a glass enlarging the figure but one hundred diameters, and it is possible to extract it on the point of a cambric-needle.

The presence of the gallery is the characteristic symptom in scabies. Next in importance among the lesions are vesicles situated at the termination of the cuniculus, as above noted. In consequence of the irritation produced by the parasite and the traumatism by scratching, the region invaded may exhibit all the symptoms of acute and chronic dermatitis, including vesicles, pustules, wheals, small papules, and hyperemia of the skin upon which these rest; crusts formed by dried serum, pus, and blood; excoriations, fissures, and, in cases of long standing, pigmentation of the skin where the disease has existed. These lesions may coexist, several appearing at the same time upon the skin of an affected individual. Small vesicles and pustules, with perhaps a few short cuniculi visible upon their summits; excoriations; larger and longer cuniculi interspersed between inflammatory papules; a tumid skin, evidently the seat of a mild grade of dermatitis; and crusts here and there,

beneath which male and young acari are ensconced—such is the composite picture of a typical eruption of scabies.

The regions affected by the eruption are the hands, especially between the fingers; the flexor aspects of the wrists; the axillary folds; the breasts (in women); the buttocks (in children); the trunk, especially its anterior surface, over the abdomen; the thighs; the genital region (in men and boys); the elbows and knees, rather than the popliteal space and bend of the elbow; the anal region; the palms (especially in women and children); and, finally, the face (in infants). As a rule, the diamond-shaped area on the back between the shoulders is exempt. It is therefore seen that the lesions occupy regions readily reached by the hands. The areas of predilection are those in which the skin is tender, or over which pressure is made; such as under the waistband of the trousers in men, and the regions pressed by the corset in women. In rare cases it may cover the entire surface. Raehlmann¹ describes a blepharitis due to scabies, producing a fall of the eyebrows. The acarus sometimes lodges in the ciliary follicles. Hebra points to the fact that between two parallels, one drawn through the nipples and the other a short distance above the knees, on the anterior surface of the body, may be recognized the greater part of the eruptive lesions in every case of scabies.

Several artificial forms of this polymorphic affection are noted occasionally. In infants the face may be invaded after contact with the breast of the mother, or the buttocks after contact with the flexor aspect of the nurse's arm. Large vesicles, and even rupioid bullæ, may result from irritation of the tender skin of children. Again, in subjects predisposed to eczema, the invasion of the parasite in one region of the body, possibly a region of preference, may originate an eczema in another locality, even though the parasite is not found in that situation. In other cases the most aggravated forms of eruption are seen, usually in persons of filthy habits, who have long suffered from the malady. Thus, extensive epidermal callosities form, filled with débris of dead parasites which have been unable to find nutriment longer in the dried rete; or extensive greenish and blackish crusts cover colonies of acari, generations of which survive beneath them. The nails in such extreme cases may be involved. Beaty² records a case of this type, which included marked involvement of the nail-region.

As a rule, the disease does not advance to severe grades. The parasites, having gained lodgment in the skin, produce characteristic symptoms of the disease in the average of cases, and are the source of so much annoyance that treatment of some sort is instituted, which is apt to restrict the extension of the malady within moderate limits. Usually after lodgment is effected, a week or a fortnight elapses before the first characteristic furrow is formed, though the itching is of earlier occurrence. The extension of the disease by the maturing

¹ Jour. de Méd., February 10, 1900.

² Brit. Jour. Derm., 1913, xxv, p. 56.

of young acari and their ravages requires a few weeks more, so that in the course of from two to three months the evolution of the malady may be considered complete. In the course of about three months more, the disease, unchecked, may become generalized. It is important to recognize the fact that the disorder may occur in the mild form in the most cleanly. During the last several years many patients from the best grades of life have suffered from intense itching, particularly after retiring at night, with only a few lesions, perhaps two or three, on the hand or wrist and several on the body, the subjective symptoms being altogether out of proportion to the objective lesions.

Even the animal parasites elect the soil upon which they thrive, and after such election thrive well or ill according to the conditions present. This is not only exemplified in the matter of individual susceptibility, but in the conditions of health of an affected person. Thus, in puerperal and typhoid fevers and other grave states of systemic disturbance, most of the parasites of scabies perish in the skin and the eruption disappears; classical symptoms may, however, recur in convalescence if some of the acari have survived with sufficient vigor to reproduce their kind.

Scabies Norvegica ("Norwegian Itch") is a title employed by some authors to designate a severe type of scabies, first described by Danielssen and Boeck, and later by Fuchs, Bamberger, and others. American cases have been recorded by Hessler,¹ and Ravogli.² In this condition there is extensive crusting from desiccation of the exudation furnished by the severe dermatitis induced by millions of mites in all stages of development. Hessler³ reported a case in which the entire surface of the body was covered with large, thick scales, which were shed freely and were riddled with acarid furrows. By counting the number of parasites in a scale of a given size, he calculated that the man had upon his person at one time not less than 2,000,000 mites and 7,000,000 eggs. Huebner calls attention to the albuminuria which may occur in severe cases.

Etiology.—Scabies is produced by the *Acarus scabiei* (*Sarcoptes scabiei*), and is contagious, the parasites being introduced upon the surface of one individual mediately or immediately from the skin of another or of an animal. All persons are supposed to be susceptible to the disease, but the intentional transmission of the disease is rather difficult. Hebra, on several occasions, failed to induce scabies when an impregnated female acarid was transferred intentionally to a sound skin and was seen to penetrate it. Only the more intimate contacts of the bed at night, and the application of nails charged with acari of both sexes, especially the young, are to be regarded as most effective for the transmission of the disease. This fact explains why the major portion of affected individuals are men. The brief shaking of the hand or transient personal contacts of the daytime are, as a

¹ Science, March 3, 1893.

² Med. News, May 13, 1893.

³ Cincinnati Lancet-Clinic, July 16, 1894.

rule, insufficient for the transmission of the disease. It is probable that the contacts incidental to the occupation of the same bed, or the use of gloves or other articles of apparel containing parasites or their ova, are essential to the transmission of the disease.

The parasites capable of inducing scabies in the lower animals (horses, dogs, sheep) occasionally are transferred to the human subject and are then capable of producing irritation in varying grades. These parasites, however, rarely beget a disorder of the grade and intensity of that following infestation with the human acarus. They soon perish from failure to propagate.

While the disease occurs very largely in public practice, among those who are familiar with filth and poverty, it not infrequently happens among individuals of a high social station. The disease is more common in Scotland, Austria, Prussia, Sweden, Norway, France, and the Orient than in America. The disorder always shows an increase in percentage when large numbers of people are congregated. During the Civil War, it prevailed with relative frequency among the masses of Americans associated in regiments with foreigners who had been but a short time in the country, and steadily progressed after that date. The influx of immigrants into the United States in the several years following 1900 caused a marked increase in scabies in this country, an increase which was also noted in Canada during the same period.¹

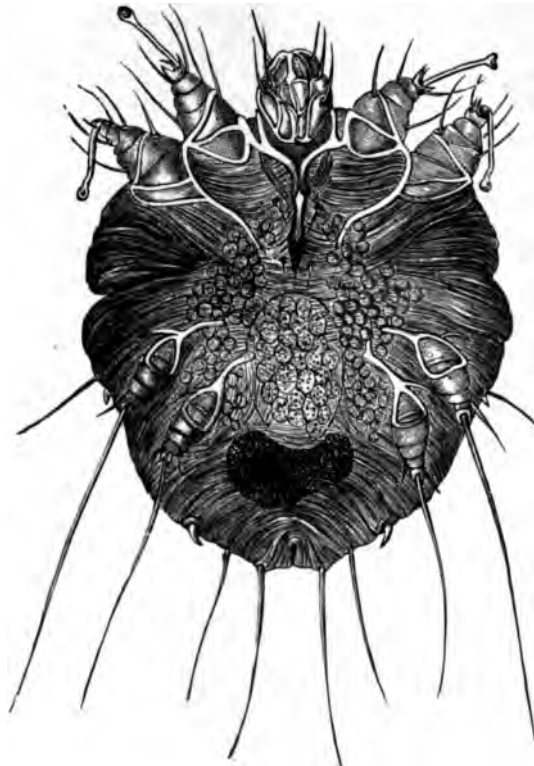
Pathology.—The pathology of the eruption induced by the parasite is that of the various phases of exudation. The differences between scabies and all other eruptions of similar type depend, in the case of the former, upon the peculiarities of the exciting cause of the disease.

Parasite.—The *Sarcoptes scabiei* (*Sarcoptes hominis*, *Acarus scabiei*, *Sarcoptes communis*) has an oval or nearly orbicular body, whitish in hue, traversed by interrupted rugæ or folds, running for the most part at right angles to its long axis. It is provided with transverse rows of minute bristles on the dorsum, and with groups of trichomæ on the front, sides, and back. There are chitinous hairs at the base of the legs. The two first pairs are provided with pedunculated ambulacra in both sexes; the two posterior pairs in the female terminate each in a long bristle; in the male, the third pair of legs terminate in a bristle, the fourth pair in a pedunculated ambulacrum. The anus lies at the posterior border of the dorsum. The male is 0.2 to 0.3 mm. in length, and 0.145 to 0.19 mm. in breadth; the female is 0.33 to 0.45 mm. in length and 0.25 to 0.35 mm. in breadth. The tunnels contain the excrement and ova, the latter measuring 0.14 mm. in length. The males commonly perish after copulation; the females only after the ova are all excreted. Six-legged larvæ hatch out in four to eight days, slough their skin three times, and then are prepared to burrow (Braun).

¹ Hyde, Amer. Jour. Med. Sci., March, 1905: Scabies in the United States and Canada.

The female alone penetrates the epidermis. In the course of her progression downward, one or two eggs are deposited daily, until from twenty to fifty have been laid. The eggs are oval, and their longitudinal axes are placed transversely to the cuniculus. In the two or three eggs found nearest the female only a yellowish color can be distinguished; in the third to the fifth, traces of the embryo are recognizable; the sixth to the ninth contain larvæ; and in the oldest the head and front legs can be discerned. When mature, the shell of the

FIG. 265



Female acarus fecundated (ventral surface). An ovum arrived at maturity is visible within the body. (After Kaposi.)

ovum is ruptured, usually between the third and sixth days, and the young acarus reaches the surface of the skin either by making exit at the original point of entry of the mother or by rupture of the roof of the burrow. It subsequently buries itself in the skin for a brief time while the process of casting its slough is completed. The acarus survives but a few days when removed from the skin and immersed in liquids which deprive it of air, such as water or oil.

Sarcoptes scabiei equi, ovis, capræ, cameli, auchenii, suis, canis, and vulpis.—Other families of sarcoptes, or acari, infest the lower animals,

such as the horse, sheep, goat, swine, dog, wolf, fox; and also fowls. Of these the female only burrows into the skin and there deposits ova. Very rarely indeed these are transferred to the skin of man, and then commonly soon perish, with the result of producing merely a temporary disorder. According to Besnier,¹ in one case the entire body of a man was infested, including the face and scalp, after transmission of the parasite from a horse.

Bosselini² describes two cases of scabies, in an old man and a boy, contracted from an ass. The eruption principally affected the extensor surfaces of the arms and the trunk; there were no intermediate lesions. In the case of a man who contracted the disease from scraping a hog with a pruriginous affection of the skin, a generalized eruption followed similar to that seen in the other cases. The animal when examined was found to be infested with acari. Artificial transmission of the disease to a child in the hospital resulted in urticaria without discovery of burrows or acari (Hyde).

Placal³ observed nine cases, in which there was a desquamating erythema in patches, which were produced from an acarus obtained from the larva of the moth which infests barley. The patients had been engaged in handling the grain (*Cf.* section on Grain Itch).

Other observers have recorded cases where a non-burrowing acarus has invaded the skin and produced more or less itching, followed by scratching and secondary infection.

Kolmer⁴ found mild leukocytosis and an increase in the number of eosinophiles in 18 cases of scabies. Schamberg and Strickler⁵ found eosinophilia in 80 per cent. of 47 cases examined.

Diagnosis.—The diagnosis of scabies must rest upon the recognition of its special features described above. The characteristic lesion of the disease is a cuniculus or furrow made by the parasite; but it will be remembered that this does not appear until one or two weeks have elapsed after invasion of the skin by the parasite. It may also be obliterated or be concealed by excoriations when the finger-nails plow it open, or by pustulation and subsequent crusting when the irritation produced is excessive. In every well-marked case, however, cuniculi can be discovered, if not on the fingers, wrists, or forearms, at least on the penis, the breast near the nipple, or upon some other covered portion of the body. With care and a little dexterity, a fine cambric-needle can be forced into the furrow, well down to and a little beyond its remote *cul-de-sac*, and the parasite removed for examination.

Next to the cuniculus and its inmate or inmates, the two most important diagnostic features of scabies are the polymorphism of the eruption and the sites of its most frequent occurrence. These sites may be described as the more important of the two. The important lesion in addition to the gallery is the vesicle; after that, all of the lesions

¹ *Annales*, 1892, s. iii, iii, p. 623.

² *Annales*, 1900, s. iv, i, p. 947.

³ *Ibid.*, 1912, xxx, p. 53.

⁴ *Giorn. ital.*, 1905, fasc. 1, p. 64.

⁵ *Jour. Cut. Dis.*, 1911, xxix, p. 339.

of a traumatic dermatitis may be found. The important sites are the areas between the fingers, about the wrists, axillæ, breasts, buttocks, and genital region; and the important factor relative to itching is the fact that this occurs after the patient has retired and is well warmed in bed.

From pruritus hiemalis, for which it is frequently mistaken, it is differentiated by the occurrence in the latter of lesions limited, as a rule, to the thighs, legs, forearms, and occasionally the trunk; the genital region and the areas between the fingers being free. The lesions of pruritus hiemalis are simply those of a traumatic dermatitis on an abnormally dry skin, galleries and vesicles both being absent. The itching occurs while the patient disrobes, rather than after he has retired.

From eczema the disease is readily differentiated by the discrete character of the lesions, their special locations, and the absence, except in severe cases, of the formation of the ordinary patches which occur in eczema. Eczema is a much more common disorder than scabies in this country.

Treatment.—The treatment of scabies is directed toward the destruction of the parasite and the relief of the cutaneous disorder which the former has induced. Ordinarily, these two indications are fulfilled at the same time. The destruction of the parasite is usually followed by relief of the resulting cutaneous lesions; and the skin, freed from the burrowing acari, is no longer tormented by the scratching, which in extreme cases is not only irresistible, but also an important element in the aggravation of the lesions. In other cases, however, the resulting dermatitis persists after removal of the original cause of the disease, and it demands special attention. Care should always be had to avoid treating the delicate skin of the infant with the severer remedies which are efficacious upon the thicker integument of the adult.

Sulphur, in all its forms and various combinations, has long been held in the highest esteem in the treatment of the disease. Other remedies, however, of acknowledged efficacy are employed with satisfactory results, among which may be named phenol, petroleum, naphthol; the oils of cloves, cinnamon, rosemary, and mint; tar, balsam of Peru, and balsam of tolu; styrax, staphysagria, and green soap.

Sulphur is commonly employed in the form of an ointment, 1 to 2 drachms (4–8.) to the ounce (30.), thoroughly rubbed first into the affected parts, and then over the cutaneous surface in general where any possible infection may exist. It is well to precede the inunction by a rather prolonged hot bath. With most patients the bath should not be repeated until the sixth morning. The ointment should be reapplied each evening for five successive nights. It is also well to have the patient wear the same underclothing all the time throughout the course of the treatment. Should irritation arise before the fifth application, the treatment may be suspended. In any case, it is well to stop treatment, as above suggested, and rest for two weeks. Over-treatment is as detrimental as under-treatment. If after two weeks any areas show activity, they may be again treated.

During the two weeks, in case much dermatitis is present, this should be treated with the soothing applications suggested for similar processes, considered in the chapter on Eczema. To prevent re-infection, the clothing should be boiled or otherwise disinfected. Sherwell¹ finds sulphur in powder as efficacious as in ointment form and less disagreeable. He directs the patient, after a soap-and-water bath, to rub gently over the body half a teaspoonful of sulphur lotum, and to dust the same amount between the sheets of the bed to be occupied at night. The bath, the powdering of the body and bed, and a change of clothing are repeated every two or three days. In the average case, one week of such treatment is sufficient.

One of the following formulas may be substituted for the ordinary sulphur ointment:

R—Sulphur sublimati,	℥xij;	48	M.
Potass. carb.,	℥vj;	24	
Adipis,	℥ix;	270	
Hardy's modification of Helmerich's ointment.			
R—Styracis liq.,	℥℥j;	4	M. (Kaposi.)
Petrolei,			
Ol. olivæ,	āā ℥ss;	āā 15	
Balsam. Peruv.,	℥℥ijss;	10	
Linimenti saponis mollis,	℥℥v;	20	
R—Potass. sulphid.,	℥v;	20	M. (Jadelot.)
Saponis,	℥xx;	80	
Ol. olivæ,	℥℥iv;	16	
Ol. thym.,	gtt. xv;	1	
R—Sulphur. sublim.,			M. (Duhring.)
Balsam. Peruv.,	āā ℥ss;	āā 2	
Adipis,	℥j;	30	

For use especially in the scabies of children.

Hebra's modification of Wilkinson's salve, Vleminckx's solution, and balsam of tolu are employed for the same purpose.

Kaposi's naphtol formula is:

R—Naphtol.,	15 parts	M.
Saponis mollis,	50 parts	
Cret. alb. pulv.,	10 parts	
Adipis,	100 parts	

McCall Anderson much prefers, on account of its pleasant aroma:

R—Styracis liq.,	℥ 3j;	30	M
Adipis,	℥ ij;	60	
Melt and strain.			

or Schultze's modification of Pastav's formula:

R—Styracis liq.,	℥℥j;	30	M.
Alcoholis,	℥℥ij;	8	
Ol. olivæ,	℥℥j;	4	
Ft. liniment.			

¹ Jour. Cut. Dis., 1899, xvii, p. 494.

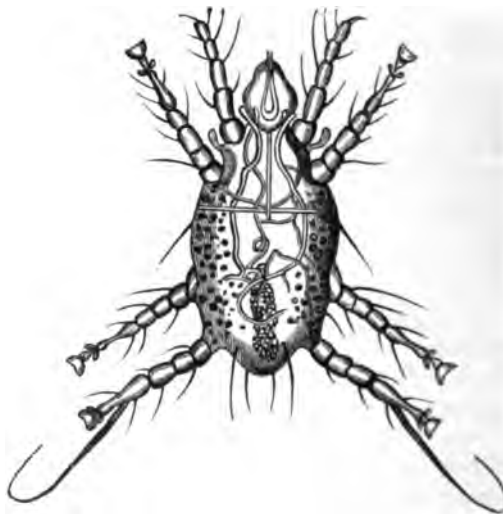
A saturated solution of sodium hyposulphite may be used at night, followed in the morning by the application of one part to four of dilute hydrochloric acid. Vlademir de Holstein praises the tincture of benzoin. Jullien prefers Peruvian balsam to all other remedies.

Prognosis.—Scabies is a curable disease, even after persistence for long periods of time. When, however, complications exist, or severe eczema continues after the efficient action of a parasiticide, the patient may experience delay before attaining complete restoration to health.

LEPTUS.¹

Synonyms.—*Leptus Autumnalis*, Harvest-bug, Mower's Mite. Fr., Rouget; Ger., Erntemilbe.

FIG. 266



Leptus americanus.

Definition.—The *Leptus* (Figs. 266 and 267) is a minute, reddish or yellowish-red insect of the family *Trombidæ*, visible to the naked eye, and found in summer and autumn clinging to bushes and grasses. It is found in both America and in Europe. Several varieties (*Leptus autumnalis*, *Leptus irritans*, and *Leptus americanus*) are described. It attacks man only after its accidental location upon the skin, where it perishes in the course of a few hours. In such situations, however, it induces considerable irritation, betrayed in erythematous, urticarial, papular, and even eczematous symptoms, accompanied by itching of various grades. The parts chiefly affected are the ankles, legs, arms, and feet. According to Duhring, children are especially liable to

¹ William MacLennan: The *Leptus Autumnalis* and its Skin Lesion. *Lancet*, 1905, p. 1765.

its encroachments. In these it is found in the axillæ, upon the scalp, and over other parts of the body. The mite may be seen in the skin as an orange-red or brick-red point, which represents often the body of the insect, its head being buried in the aperture of a follicle beneath. Examined after extraction, it is seen to have a relatively large cephalic extremity. It has a short, cylindrical, and conical haustellum, composed of fused double maxillæ; and two strong, hooked, five-jointed palpi, which can be rolled up. There are also two hatchet-like mandibles. It has a well-rounded or oval body, 0.3558 mm. long and 0.32 mm. broad, provided with three pairs of legs.

Treatment.—The disorder is relieved by the application of balsam of Peru in olive oil, carbolated oil, spirit of camphor, or other mild stimulant or parasiticide.

FIG. 267



Leptus. (After Küchenmeister.)

FIG. 268



Rouget.

PULEX PENETRANS.

Synonyms.—*Dermatophilus Penetrans*, *Sarcopsylla Penetrans*, *Rhinochoprion Penetrans*, *Nigua*, *Chigoe*, *Jigger*, *Sand-flea*. Fr., *Puce de Sable*; Ger., *Sandfloh*.

The sand-flea, found originally in tropical America, including the West Indies, within the last thirty years has appeared in many portions of tropical Africa and the adjacent islands, as well as in India.

This parasite is a minute, brownish-red, egg-shaped insect, the female of which, after impregnation, penetrates the skin of man and of the lower animals, including rats and mice. It attacks the skin in man usually about the toes, near the nails, less frequently other parts of the foot, and rarely the anal region, scrotum, or face. The parasite pierces the skin in an oblique direction, and all except its last two segments are embedded (Castellani and Chalmers). Swelling and irritation follow, with the production of edema and suppuration, and, in severe cases, abscess-formation and ulceration, accompanied by lymphangitis.

The treatment of the disease is by extraction of the flea by means of a heated needle, whereby it is destroyed simultaneously. The resulting wound should be dressed antiseptically.

Prophylaxis in "chigger-regions" is of chief importance and is secured by sweeping accumulations of dust from walls and floors, which should be regularly dusted with an insecticide powder, such as pyrethrum.

DRACONTIASIS.¹

Synonyms.—*Filaria Medinensis*, *Filaria Dracunculus*. Guinea-worm Disease, *Dracunculus Medinensis*, Medina Worm, Guinea Worm. Fr., Dragonneau, Ver de Kutégál; Ger., Peitschenwurm, Medinawurm; Dutch, Guineesche Draake.

Definition.—The records of the guinea-worm disease extend to a remote antiquity. It is a disorder due to invasion of the body by a nematode parasite, the *Medina worm*, and occurs almost exclusively in tropical countries, more particularly along the West African coast, in the Soudan, Egypt, and Abyssinia; in Asia, especially in the countries bordering on the Persian Gulf, and British India; in the Fiji Islands; and in America, particularly in Guiana, Brazil, and the Antilles.

Symptoms.—The lesions due to invasion of the skin by *Dracunculus medinensis* are observed first at the point where the worm is about to make exit, which point may be at a considerable distance from that where it entered, and the exit may be made after an interval of several weeks or months. This approach to the surface for the purpose of securing exit is accomplished only when the worm is quite mature, at which time it can be felt beneath the surface, suggesting the presence of a soft cord. A local inflammatory process is followed by the formation of a vesico-papule, a pea- to nut-sized inflammatory nodule, or a large furuncular swelling, accompanied by sensations of tension and more or less pain. The lesion, after accidental or intentional rupture, gives exit to a clear, serous fluid, in which the uncolored head of the worm may be recognized. If the fluid be turbid, it is believed that the young embryos have escaped from the uterus. The head appears either at once or in the course of a brief time, producing slow and sinuous movements by alternate contractions and elongations. The entire worm and its young may be wholly extruded in the course of a week or more; or the head may be withdrawn and another swelling form at another part of the surface, the first orifice meantime closing; or, in unskillfully managed cases, the worm may be torn so that the head only is removed, and then a severe lymphangitis, with inflam-

¹ BIBLIOGRAPHY: Bloch, Allg. med. Ctr.-Ztg., 1899, lxxviii, p. 729; Foulkes, Brit. Med. Jour., 1898, ii, p. 236; Fox, T., Lancet, 1879, i, p. 330; Harrington, Brit. Med. Jour., 1899, i, p. 146; Mackenzie, Ind. Med. Record, 1898, p. 326; Manson, Brit. Med. Jour., 1895, ii, p. 1350, and Tropical Diseases, 4th ed., 1910, p. 667; Perrin, Annales, 1896, s. iii, vii, p. 131; Roux, Traité prat. des Mal. des Pays Chauds, 1888, iii, p. 354; Scheube, Diseases of Warm Countries, p. 379 (bibliography); Castellani and Chalmers, Manual of Tropical Med., 2d ed., 1913, p. 1441.

matory, suppurative, and even gangrenous symptoms may supervene, producing, in fact, the train of symptoms now well recognized in connection with septicemia. In some cases, however, the body may be discharged later than the head, after the mechanical separation of the latter, without serious consequences. The escape of embryos into the adjacent tissue is regarded also as a grave complication.

The chief sites of exit are the ankle and the foot, particularly the heel; but in rarer cases the leg, thigh, buttock, penis, scrotum, hand, trunk, neck, or face may be selected. There is usually but one worm in a single subject of the disease, but the number may be indefinitely large in persons exposed.

Persons of both sexes and all ages are liable to be invaded; but the disease is of more frequent occurrence in the rainy season, and in male negroes and day-laborers. The disorder is produced by the *Dracunculus medinensis* gaining access to the body through drinking water containing cyclops infested with the embryos of the worm. After entering the stomach the cyclops are destroyed by the gastric juice, and the *Dracunculus* pierces the gastric wall and develops to maturity, after which it migrates to the various parts where it is commonly found.

Pathology and Natural History of the Worm.—The female worm alone produces the disease. It is, when mature, a yellowish-white, cylindrical filament, gradually tapering toward the caudal extremity. It averages 60 to 80 mm. in length and 0.5 to 1.7 mm. in diameter, the body being extremely extensible by reason of the elasticity of its cutaneous envelope. The cephalic extremity is rounded and terminates in an oval, shield-like disk, in which is a centrally placed triangular oral orifice. There is a small papilla on each dorsal and ventral edge and six smaller ones on the borders of the shield. While there is a straight intestinal tract extending through the body of the parasite, its bulk is composed of an enormous uterus, which is capable of containing, according to estimates made, between eight and ten millions of embryos.

The embryos, without decidua, are flattish, possessing a long, awl-shaped tail, a three-lipped mouth, and a digestive canal. They are capable of surviving for a week in water; and longer in moist earth or water polluted with material which provides them sustenance. Manson states that the embryos, when they have obtained access to the water, transfer themselves to the body-cavity of the *Cyclops quadricornis*, fifteen or twenty at a time inhabiting the host, without apparent inconvenience to the latter. Soon the exuvium is shed two or three times, the tails drop off, the worms acquire a cylindrical shape, and develop a tripartite arrangement of the caudal extremity.

In from ten to a maximum of fifteen months the maturity of the female which has been impregnated is attained, and the parasite finds her way from the muscles or other tissues in which she has been lodged or to which she has travelled to the surface of the body.

Diagnosis.—The diagnosis (to be made in countries where the disease is endemic) is based upon the discovery of the worm.

Treatment.—The usual method of treatment by the natives of the countries named is to secure carefully the head when it appears, and to tease out the worm very gently day after day until the entire body is extracted, securing the accessible portion by winding it about a bit of stick or of paper. Continuous irrigation of the wound is both recommended and practised where the disease is common.

Manson has protested against winding out the guinea-worm, stating that at best this process merely shortens by a few days the duration of the treatment in case the parasite is situated properly in the tissues without twists or turns, or if it has arrived at a stage of life when, having discharged its young, it is ready to come out spontaneously. If, as is often the case, the worm is twined and twisted among the tissues, and if she is still emitting her young, she will resist traction, a process which will often result in rupture. In consequence of rupture at this time myriads of young escape into the tissues, producing violent inflammation, which is accompanied frequently by secondary infection and possibly by sepsis. To determine if the worm is ready to come out spontaneously, the opening of the tumor may be douched for a number of minutes at a time, several times a day, by dripping cold water over it. When, under the influence of this douching, the worm no longer emits young, careful winding out is not objectionable.

A successful method devised by Émily¹ consists in the injection of a solution of mercuric chlorid (1 to 1000) into several places in the swelling produced by the worm before the skin is pierced. This kills the worm, which may be absorbed subsequently, or, if cut down upon a day or two later, her body can easily be withdrawn. In case the head of the worm be already protruding, the solution may be injected directly into her body, which is removed easily the following day. This method also reduces the time of treatment from not less than four weeks to the much shorter period of four or five days. The method has been successful in the hands of several observers.²

Prophylaxis is secured by protection of drinking water from pollution, or by having it boiled or filtered before use.

Prognosis.—The prognosis is favorable, save in cases in which septicemic symptoms develop as a consequence of coccogenous infection.

CYSTICERCUS CELLULOSÆ CUTIS.

Cysticerci have been recognized in the skin and subcutaneous tissues by Rokitsansky, Guttmann, Schiff, Férréol, Duguet, Lewin,³ and other observers. The subjects are usually consumers of uncooked meats, especially of pork. In these cases one or many oval or roundish, firm, elastic, cutaneous or subcutaneous, pea- to walnut-sized tumors, isolated or disseminated, and unproductive of pain, project from the

¹ Arch. de Méd. navale, 1894, No. 6, lxi, p. 460.

² Manson and Boyd, Brit. Jour. Derm., 1896, viii, p. 37.

³ Cf. Vierteljahr., 1894, xxvi, pp. 70 and 271, for review of literature.

general level, and are enveloped by an unaltered integument. They occur upon the trunk and the extremities. In this condition they remain without change for years, and may accompany *cysticerci* of the brain and other portions of the body, productive of the serious disturbance of the economy which such invasions induce. If the skin tumors be opened and their contents examined, the parasite (which is the scolex or hydatid of *Tænia solium*) will be recognized as an ampulliform sac, with a cephalic appendage, reëtrant or projecting, and provided with four suckers and a coronal of hooklets. By no external characteristics can such tumors be distinguished from others of similar size and external appearance. Only in the rare cases of nervous complication could a suspicion of the real character of the disorder arise. Respecting this matter, however, the diagnostician is in no worse position than when called upon to recognize *cysticerci* of the viscera. *Cysticerci* of the liver are recognized during life and subsequently removed by operative procedure.

Diagnosis.—The diagnosis is from gumma, lipoma, epithelioma, and sarcoma. The first occurs only in the syphilitic; the second has a peculiarly uneven surface and firm feeling; the third is largely facial in situation; and the last is of a malignant character and relatively rapid career.

ECHINOCOCCUS.

Geber¹ states that the parasite *Echinococcus* (larva or hydatid of the *Tænia echinococcus* of the dog) is found in the human skin. Of 336 cases reported by Davaine, the parasite occurred thirty times in muscular and subcutaneous tissues, more often in women than in men. The soft, fluctuating tumors or vesicles produce a disagreeable sensation of tension, and they undergo fatty or other metamorphosis after the death of the encapsulated parasite, which usually occurs in from one to two years. Exploration of the superficially seated, fluctuating tumor, covered with unaltered integument, usually demonstrates its nature.

DISTOMA HEPATICUM.

Küchenmeister and Zurn² report three instances in which the embryos of the large liver-fluke were encapsulated in subcutaneous tissue. The tumors were painful or painless, and occurred on the head, trunk, and extremities.

Other animal parasites or their larvæ are occasionally concerned in the production of cutaneous or subcutaneous lesions. Stiles,³ under the title, "Proliferating Cestode Larva," describes a case, reported to him by Gates, in which large numbers of cutaneous and subcutaneous nodules were found, in addition to large and small tumors,

¹ Ziemssen's Handbook on Skin Dis., p. 550.

² Quoted from Geber, Ziemssen's Handbook on Skin Dis., p. 550.

³ Jour. Cut. Dis., 1908, xxvi, p. 345.

in the abdominal cavity, as well as enlargement of the lymph-glands on the side most affected. The worms procured from these lesions were identified by Stiles as being cestode larvæ. The author describes a similar case occurring in Japan.

Cutaneous lesions, consisting of vesico-pustules, produced by the *Oxyuris vermicularis* about the perianal region, are described by Vignolo-Lutati.¹

UNCINARIAL DERMATITIS.²

Synonyms.—"Ground-itch," Mazamorra.

Definition.—Uncinarial dermatitis is a dermatitis produced by the larvæ of the *Ankylostoma duodenale* and *Necator americanus*. The disorder usually occurs on the feet, particularly on the soles and about the toes. The cutaneous symptoms begin with itching, which is followed by redness of varying shades, tumefaction, and the formation of papules, papulo-vesicles, and bullæ. More serious grades may occur, and at times pustulation and ulceration follow from secondary infection. The lesions may be limited to the region of the toes or involve a large part of the foot. Recurrences may happen from reinfection.

The larvæ of the hook-worm are found in the sand and dirt, being originally deposited there in discharges from the intestinal canal of infected individuals. They attack only those who go barefooted. The disorder is more prevalent in warm, rainy weather, heat and moisture favoring the growth of the parasite. The dermatitis above described may be the initial stage of the general disease, **Ankylostomiasis** (*Agchylostomiasis*; *Uncinariasis*; *Hook-worm Disease*; *Dochmiasis*; *Tropical Chlorosis*; *Dirt-eater's Anemia*; *Mountain Anemia*), which is a progressive anemia occurring in man after the invasion of the intestinal canal by the *Ankylostoma duodenale* (*Dubini*) and the *Necator americanus* (*Stiles*). As determined by Looss, in 1904, it gains access to the body through the skin, as above noted, or is more rarely ingested. Schaudinn confirmed the observations of Looss by the production of ankylostomiasis in monkeys after spreading a watery suspension of the parasites over the shoulder-blades. After penetration of the body, a long train of systemic symptoms may be induced, including not only the characteristic anemia, but also grave disorders referable to the digestive, circulatory, and nervous systems, in both acute and chronic manifestation, death resulting in severe attacks of the malady.

¹ Archives, 1907, lxxxvii, p. 81.

² Stiles, Trans. State Med. Assoc. of Texas, 1903, p. 353. Leonard, Jour. Amer. Med. Assoc., 1905, xlv, p. 588. Tenholt-Bochum, Zeitschr. f. Medizinalbeamte, 1905, No. 4; abstr. Monatshefte, 1905, xli, p. 409 (Ueber die Loossche Lehre, betreffend die Einwanderung der Ankylostoma-Larven durch die Haut). Dubreuilh-Bordeaux, La Presse méd., 1905, No. 30; abstr. Monatshefte, 1905, xli, p. 409 (Ueber das Vorkommen des Ankylostoma in der Haut). Smith, C. A., Jour. Amer. Med. Assoc., November 24, 1906, p. 1693 (3 illustrations). Ashford and King, ibid., August 10, 1907, p. 471. Schöffner-Deli-Sumatra, Centralbl. f. Bakteriol. u.s.w., Bd. 40, Heft 5; abstr. Monatshefte, 1907, xlv, p. 393 (Ueber den neuen Infektionsweg der Ankylostomalärve durch die Haut).

The disease has been recognized in Egypt, Southern Europe, Japan, Australia, the East Indies, Ceylon, and South America. It has attracted special attention here in consequence of its prevalence in the Southern States and in Porto Rico.

Treatment.—The dermatitis of the feet is treated with the same remedial agents that might be used for an acute eczema. In the early stage, salicylic acid in collodion, 1 part to 6, is recommended (Castellani). Antiseptic lotions containing boric acid, phenol, and bichlorid of mercury are employed, as well as salicylated ointments. The internal treatment should be instituted the moment the dermatitis is recognized (Castellani), consisting in the employment of thymol, eucalyptus oil, eucalyptol, beta naphthol, or male fern.

TRYPANOSOMIASIS.¹

Human trypanosomiasis is an affection produced as a consequence of the invasion of the body by the *Trypanosoma gambiense*, which gains access either through the medium of the tsetse fly (*Glossina palpalis*) or a similar insect which may attack the skin. This *Trypanosome* is a flagellate blood parasite, from 15 to 30 μ in length and from $1\frac{1}{2}$ to 2 μ in width. The mode of invasion, the life-history of the parasite, and other questions of importance in this connection have not been fully determined.

Symptoms.—Cutaneous symptoms occur in the region of the original wound made by the fly, and later as a more or less generalized eruption, due to toxic processes accompanying the general disorder. The bite of the insect produces local irritation, which is followed in the course of a few hours by redness, swelling, tension, and local elevation of temperature. This develops into a slightly elevated, inflammatory lesion, red or violaceous in color, varying in size up to 2 cm. in diameter. It is slightly tender and painful on pressure and is frequently accompanied by enlarged glands. Occasionally, the process is more intense, being accompanied by marked redness and swelling, associated with lymphangitis and elevation of temperature, but unaccompanied by suppuration. These lesions are found chiefly about the legs, knees, groins, axillæ, and neck.

Later in the disease, vesico-papular and papular lesions occur, accompanied by subjective sensations, also a fugitive erythema of toxic type, occurring in circinate patches, some of which are several inches in diameter, their margins fading gradually into the surrounding skin. In addition, a polymorphic urticarial erythema may be present.

Darré describes congestion and edema in the corium, with a perivascular, lymphocytic infiltration, also some inflammatory reaction

¹ Rogers: Fever in the Tropics, London, 1908, p. 96. Castellani and Chalmers, Manual of Tropical Med., 2d ed., pp. 307-347 and 966-991, inclusive. Manson, Tropical Diseases, 4th ed., p. 150. Darré: The Cutaneous Symptoms of Human Trypanosomiasis, Annales, December, 1908, p. 673; abstr. Brit. Jour. Derm., 1909, xxi, p. 163.

of the perivascular connective tissue, and the presence of the parasite in the superficial plexus of the blood-vessels of the corium.

The terminal stages of the disease are those now well recognized under the title "sleeping sickness," for details of which the reader is referred to the standard treatises on the subject. This stage of the disorder has thus far been followed by fatal results in a majority of cases.

Treatment.—Prophylaxis is to be sought by the avoidance of districts where the *Glossina* is found; also by protection from all insects. Arsenic and mercury have been thought to be effectual in some cases. Locally, soothing and antipruritic applications may be employed if necessary.

FIG. 269



Demodex folliculorum.

DEMODEX FOLLICULORUM.

Synonyms.—Steatozoön, or *Acarus folliculorum*. Fr., *Acare des follicules*; Ger., *Haarsackmilbe*.

Definition.—This parasite was discovered in 1841, by Henle. It is a microscopic creature in the form of an elongated and jointed worm, with clearly defined cephalic, thoracic, and abdominal portions; with eight legs, four on each side of the thorax, each leg with three articulations, and terminating in three small hooklets. The posterior extremity of the body is a vermiform appendage, terminating in a conical point (Fig. 269).

The *Demodex folliculorum* is found upon the free surface of the integument, those parts of the skin particularly where the sebaceous glands are large, and on patients affected with acne or seborrhea oleosa. It is found also upon those free from all evidences of disease. Du Bois¹ found the demodex or its larvæ in all of 200 persons between the ages of 20 and 85 years examined by him. In another series his findings were as follows: In children under 5 years none was found; between 5 and 10 years it occurred in 50 per cent.; while between the ages of 10 and 20 the percentage was the same as in adults. It is encountered also in the substance of the comedo-plug, where at times from five to twenty may be discovered in a single follicle. A demodex which is considered to be a variety of that discovered upon the skin of man infests dogs, mice, and other lower animals; and may in the latter be the source of a disease characterized by furuncular lesions, abscesses, and even fatal results. None of these parasites is, however, known to be transmissible to man.

¹ Annales, April, 1910, p. 188; abstr. Brit. Jour. Derm., 1911, xxiii, p. 89: The *Demodex Folliculorum* of Unna in the healthy skin.

De Amicis,¹ Majocchi,² and Dubreuilh³ report cases of pigmentation of the skin due apparently to this parasite. The case reported by Dubreuilh was that of a woman forty years of age. The lips, cheeks, other portions of the face, the mammary surfaces, and chest were the seat of light-yellowish spots, where the demodex was discovered in great numbers. The surface was somewhat rugous, due apparently to a peculiar whitish substance, resembling rice-grains, accumulated about the follicular orifices, twelve or more parasites being visible in each field examined. In the case of De Amicis's patient, who was twenty-seven years of age, the face presented a *café-au-lait* hue over the lips and chin. Majocchi's was a male patient, whose discoloration occurred in the form of a brownish zone surrounding a patch of atrophic lupus.

The most effective treatment is by the use of shampoos with green soap.

MYIASIS CUTANEA.⁴

Joseph divides all cases of infection by larvæ of flies into (1) *Myiasis externa* or *dermatosa*, and (2) *Myiasis interna* or *intestinalis*. The former he further subdivides into *Myiasis dermatosa mucosa* and *Myiasis dermatosa æstrosa*.

The larvæ of flies of the families of *Muscidæ* and *Cæstridæ* are occasionally deposited on or in the skin, inducing various changes. The different species of *Muscidæ* deposit their ova on open wounds, foul ulcers, or in the nasal cavity or auditory canal in persons suffering with catarrhal or suppurative processes in these situations. A marked example was seen by the author in a fungating carcinomatous ulcer of the face. Markedly destructive effects may be produced in these situations by extension into the deeper tissues and various connecting sinuses about the head and face.⁵ The family of *Cæstridæ* (*Cæstrus*—gad-breeze, gad-fly, bot-fly) deposit their ova on the normal skin by puncture, and the larvæ burrow into the skin and subcutaneous tissue. The areas attacked are usually the exposed parts, and the developing larvæ produce inflammatory nodules and tumor-like new formations. There is usually a central opening in the lesion, from which a sanious, seropurulent or sanguinopurulent fluid escapes, and from which the larvæ may be pressed. The disorder is rarely seen in this country, but is not uncommon in Central and South America.

¹ Giorn. ital., 1898, iii, p. 205.

² Ibid.

³ Jour. de Méd. de Bordeaux, January 27, 1907, No. 4.

⁴ BIBLIOGRAPHY: Joseph, Monatshefte, 1877, pp. 49, 106, and 158. Walker, Brit. Med. Jour., 1870, i, p. 151. Abraham, Trans. Derm. Soc. of Great Britain and Ireland, 1896-1897, iii, p. 62 (Remarks on cutaneous myiasis due to cæstridean larvæ. A good exposition of the subject, with extensive bibliography). Gilbert, Archiv. Inter. Med., 1908, ii, p. 226 (Infection of man by dipterous larvæ, with report of four cases. Excellent bibliography, covering the entire subject). Costa, Jour. Cut. Dis., 1910, xxviii, p. 24 (Two important parasites of the skin).

⁵ Yount and Sudler, Jour. Amer. Med. Assoc., 1907, xlix, p. 1914 (Human myiasis from the screw-worm fly. Description of a large number of nasal cases).

The larvæ occasionally burrow under the skin, producing irregular lines,¹ which are compared to inflamed lymphatics, but are of a purplish or reddish-purple color; at the end of these suppuration occurs before the larvæ are discharged. Strauch² recorded a case with two lesions only, in one of which a tumor the size of a walnut developed, composed of a dense new-formation of connective tissue, in the centre of which the larva was found. Smith³ recorded a case where the parasite travelled from the ankle up the leg to the axilla, then down to the elbow, finally locating on the back of the neck. Tenderness, pain, and itching are described in the lesions.

Treatment.—The removal of the parasite is accomplished by free incision of the inflammatory lesion and compression, the subsequent wound being dressed in accordance with the rules of surgery.

CREEPING ERUPTION (LEE).⁴

Synonyms.—Larva migrans (Crocker), Hyponomoderma (Kaposi), Dermamyiasis linearis migrans œstrosa (Kumberg).

This affection was first described by Lee, followed by Crocker, Kaposi, Neumann, Van Harlingen, Stelwagon, and others. It is an affection produced by the larva of an insect, and is said to be contracted where the sand accumulates on the sea beaches (Cf. Machado). The disorder is characterized by the occurrence of a narrow, slightly raised, thread-like line, which extends over the cutaneous surface in an irregular, zig-zag manner, producing loops and other peculiar configurations. This line may be light- or dark-red in color and comparatively smooth, or be surmounted by a linear, vesicular formation, or present an irregular, beaded appearance. In the older portion the redness fades, the lesion becomes darker in color, and may leave slight pigmentation. Black nits are said to have been found on the hairs

¹ Gilbert, loc. cit., p. 233 (Case report. Parasite *Hypoderma lineata*, second stage, constantly changing its location). Miller, Jour. Amer. Med. Assoc., December 3, 1910 (similar case produced by same parasite, as identified by Stiles).

² Jour. Cut. Dis., 1906, xxiv, p. 522.

³ Trans. Internat. Med. Cong.; abstr. Archiv. of Derm., 1882, xiii, p. 45.

⁴ BIBLIOGRAPHY: Lee, London Clinical Trans., 1874, viii, p. 44; and ibid., 1884, xvii, p. 75. Crocker, Dis. of the Skin, 2d ed., p. 926. Kaposi, Wien. klin. Woch., 1898, xi, p. 399. Neumann, Archiv, 1896, xxxiv, No. 1, p. 905 (reference Brit. Jour. Derm., 1896, viii, p. 145); Verhand. der Wiener dermat. Gesellschaft; and Archiv, 1906, lxxxii, p. 421. Kumberg, abstr. Dermatolog. Centralbl., 1897-1898, i, p. 283 (quoted from Stelwagon). Van Harlingen, Amer. Jour. Med. Sci., 1902, cxxiv, p. 436. Stelwagon, Jour. Cut. Dis., 1903, xxi, p. 502; and ibid., 1904, xxii, p. 359. Hamburger, ibid., 1904, xxii, p. 217 (Creeping eruption: its relation to myiasis. One histological and one clinical illustration, and bibliography). Lenglet and Delaunay, Annales, 1904, s. iv, v, p. 107 (A case of larva migrans). Shelmire, Jour. Cut. Dis., 1905, xxiii, p. 257 (Report of a case of creeping eruption). Kengsep, Centralbl., 1906, ix, pp. 194-199 (Epidermidosis Linearis Migrans. The writer concludes by giving a résumé of the literature of the subject and discusses the nomenclature and pathology of the disease). Hutchins, Jour. Cut. Dis., 1906, xxiv, p. 270 (Creeping disease: report of two cases of larva migrans, with special reference to the treatment). Moorehead, Texas Med. News, 1906, xv, p. 67 (Creeping disease). Boas (Kopenhagen), Monatshefte, 1907, xlv, pp. 505-512 (four illustrations, and references). Haase, Jour. Cut. Dis., 1910, xxviii, p. 393. Gosman, Jour. Amer. Med. Assoc., January 1, 1910, p. 38. Machado, Archivos Brasileiros de Medicina, June, 1912, No. 3, p. 395; abstr. Jour. Cut. Dis., 1913, xxxi, p. 610.

near the burrow by Sokoloff. The larva, as identified and described by the latter observer, is about 1 mm. in length, with ten segments and hooklets and two head-end suckers, and is considered by him to be the larva of a bot-fly, *Æstridae*, of the genus *Gastrophilus*, and probable species *Hemorrhoidalis*. The line extends over the surface of the body at the rate of an inch or more a day, usually in curves, but occasionally following a straight course. In Haase's case the excursions of the insect were made only at night. There are no subjective symptoms, except moderate itching and burning at the site of the organism. The lesions are situated chiefly about the feet and buttocks, though other exposed portions, such as the hands, forearms, and lower portions of the legs, may be the starting point, whence by extension large areas of the body are covered.

According to Crocker, the disease is comparatively common in children in Arabia, and is also of frequent occurrence in Russia. A number of examples have been reported in America within the last few years. The disease is readily recognized, the length of the line and other characteristics above described differentiating it from other disorders. Hamburger states that the burrow in certain cases resembles the cuniculus of the *Acarus scabiei*.

Treatment.—The treatment as usually employed consists in cauterization or excision of an area about the extending point. Stelwagon used cataphoretically a solution of mercuric chlorid, 2 grains to the ounce (0.13–30.), on a one and one-half inch area around the advance end of the burrow, and applied a minute quantity of nitric acid to the suspected site of the parasite, just beyond the extreme of the line. Hutchins was successful by using a few drops of chloroform.

CRAW-CRAW.¹

Craw-craw is a term used by the natives of the West African coast to designate several diseases of the skin, including scabies, ringworm, eczema, and dermatites of various types occurring in negroes. Most authors agree that great confusion prevails respecting the affection to which the name should be strictly limited. The group of symptoms most commonly described under this title resemble scabies.

The lesions begin as pinhead-sized papules, which may be discrete or grouped. These shortly develop into vesicles, which in turn are succeeded by pustules. They occur chiefly on the limbs and trunk, being found particularly between the fingers and on the wrists and elbows. The face is usually exempt. The eruption is associated with violent itching, which is lessened in the cooler part of the day, and disappears entirely, together with the eruptive symptoms, when the patient goes to a cooler climate; but upon a return to tropical temperatures the disease recurs.

¹ Scheube, *Diseases of Warm Countries*, 1903, 2d ed., p. 522; Manson, *Tropical Diseases*, 1910, 4th ed., p. 794.

O'Neil isolated a small, filarial-like parasite from the lesions, which Manson suggested might be *Filaria perstans*. Its causal connection with the disorder is not proven. Castellani and Chalmers¹ limit the title crawl-crawl to a disorder described by Plehn as *dermatitis nodosa*. This is purely a papular disorder. The lesions are abundant, and occur on the legs and arms usually, but may spread and occupy the entire surface except the face and scalp. The papules are hard, irregular in shape, and may be roundish, flattened, or acuminate, from millet-seed- to small-pea-sized, and sometimes scale capped. Consecutive lesions occur only from scratching.

Etiology.—The cause of the disorder depends upon the symptom complex to which the term is limited. In all cases the disorder appears to be contagious and infectious. In one group of cases the parasite above noted was described. Plehn was successful in inoculating the disease into healthy negroes.

Treatment.—Locally, cleanliness and the employment of appropriate parasitocides, such as boric acid and phenol solutions, and mercuric chlorid, 1 to 1000, or salicylic-acid preparations, are recommended. Plehn found a 3 per cent. solution of lysol locally applied of value. Removal to a cooler climate was effective in one group of cases.

Prognosis.—In general, the outlook is favorable, though in some varieties the condition of the patient becomes moderately serious.

¹ Manual of Tropical Medicine, 2d ed., 1913, p. 1593.

CLASS IX.

DISEASES OF THE APPENDAGES.

DISEASES OF THE SWEAT-GLANDS.¹

HYPERIDROSIS.

Synonyms.—Idrosis, Hydrosis, Ephidrosis, Sudatoria, Polyidrosis, Hyperhidrosis. Fr., Hyperidrose.

Definition.—Hyperidrosis is an exaggerated quantitative effusion of sweat, localized or generalized, moderate or severe, acute or chronic, persistent or relapsing, the secretion accumulating in visible drops upon the surface of the skin.

Symptoms.—This condition may be physiological, as the result of active exertion in a medium of high temperature; or it may be pathological in character, and in the latter case be either general or partial.

The expression, "general sweating," is self-explanatory. The entire skin of the body participates in the process, and the surface conditions which result favor the development of intertrigo, sudamina, miliaria, and occasionally of folliculitis and furunculosis. Local hyperidrosis is the exaggerated quantitative effusion of sweat limited to certain definite portions of the skin, as the palms, the soles, the dorsa of the hands and feet, the interdigital spaces, the genitals, the axillæ, and the temples. In such cases the secretion occurs moderately or greatly in excess of normal, varying in this respect somewhat in different degrees of temperature and in the rapidity of the circulation. It may involve one or both sides of the body, being generally symmetrical upon the extremities and asymmetrical upon portions of the face.

The typical expression of this disorder may be studied in the hands, which are continually moistened, clammy, or dripping with fluid within a brief time after the most careful drying of the parts. The sweat is commonly cold to the touch of another. In such cases, particularly in women, almost continuous drying of the hands is necessary to protect the clothing, and the rapid soiling of gloves practically interdicts their use. The disadvantages thus arising in individuals of both sexes who are engaged as tradespeople, artists, or

¹ Excellent bibliographies relating to the various disorders of the sweat-glands may be found in Török's contribution to the subject in Mraček's Handbuch, Bd. 1, pp. 386-485.

hand-workers are obvious. The skin on the palmar surface of the hand, and often on the dorsal aspects of the fingers, has a sodden, thickened appearance, and some degree of hyperkeratosis is always present in severe cases. Occasionally, vesicles are formed, which later become centres of slight exfoliation.

With and without this local excess of perspiration involving the hands, there occurs the hyperidrosis of the feet. The outpour of sweat varies in amount from a mere dampening of the feet to a complete saturation of the stockings and the leather of the boots or shoes with the secretion. There is usually a very offensive odor of the region, originating partly in the primary fetor of the secretions themselves, and partly in the subsequent chemical decomposition of the latter. The integument, constantly macerated, may become painful, tender, and slightly reddened; occasionally, there is vesiculation or exfoliation of patches of sodden epidermis, especially between and beneath the toes, in which situation fissures are prone to occur. As upon the hands, though to an even greater degree, a hyperkeratosis is found. The nails are usually thickened and distorted, the result of participation in the keratotic process.

Hyperidrosis of the axillary and genital regions is very often attended with more or less bromidrosis, and almost invariably leads to some degree of intertriginous irritation. The wearing of impervious dress-shields favors the retention and decomposition of the secretion, and thereby adds to the macerating and irritating effects upon the skin of the part. Itching is a frequent complication, and folliculitis, furunculosis, or a dermatitis seborrhoica may supervene. Excess of sweat in the inguinal and genito-crural regions, because of the peculiarities of the location, is especially apt to decompose. More or less fetor results, and if the individual is inclined to obesity a troublesome intertrigo or follicular dermatitis may develop. Occasionally, the sweating may be limited to a small area. Such a case recorded by Sutton¹ was limited to a part of one eyebrow.

Etiology.—General sweating to a pathological extent occurs in the obese and in those who are subjects of systemic disease, notably tuberculosis, acute rheumatism, malaria, rickets, exophthalmic goitre, and various febrile disturbances. It may result from adynamia due to any cause. Both local and general hyperidrosis has been observed in organic diseases of the nervous system, such as general paralysis² and myelitis. Traumatisms, gliomata, gummata, scleroses, and other lesions affecting the cerebrum, medulla, cord, ganglia, and nerve-trunks have all been followed by hyperidrosis of the entire body or of a part only. It is extremely common in persons with an habitually rapid heart, and in those who use alcohol, tobacco, coffee, and tea to excess.

Heredity is a factor in some instances, and congenital cases are on record. Localized sweating may be induced reflexly through stimula-

¹ Jour. Amer. Med. Assoc., 1912, lix, p. 1193.

² De Montzel, *La Presse Méd.*, January 31, 1903.

tion of the olfactory and gustatory nerves by ingestion of certain articles of food—tomatoes, cheese, pickles, onions, apples, and other articles.¹

Local hyperidrosis of the feet is frequently associated with flat-foot.²

The frequent obscurity of etiologic relations in hyperidrosis is entirely explicable when certain facts are considered. The predominant influence of the nervous system must be admitted. Though but indefinitely located, the existence of special centres and fibers in the central nervous system for the control and operation of the sweat-glands is evidenced by a mass of clinical observation. The relation of the sympathetic nervous system to all glandular activity is well known. The positive results of experimentation and the deductions warranted by clinical experience indicate that irritation of those centres and fibers, either central or sympathetic, which are secreto-motor, or paralysis of those which are secreto-inhibitory, accounts for general or local hyperidrosis, according to the extent of the distribution of the nervous elements concerned. The etiologic complexity of the situation arises from the fact that this stimulation or paralysis may follow numberless causes: emotion, the action of circulating toxins, direct injury, pressure effects, or reflex action from the periphery or from within. The efforts of the clinician in accumulating data must be supplemented further by those of the anatomist and physiologist before the etiology of hyperidrosis is completely worked out.

Pathology.—Robinson,³ who examined a number of sections from the palm of the hand, failed to detect any abnormal feature either in the glands or in the epithelium. The disorder is to be regarded as purely functional; and any anatomical changes in the coil-glands or the sweat-pores are probably accidents of such derangement of function.

Treatment.—When universal, hyperidrosis is to be treated internally by the aid of such remedies as are indicated by the general condition of the patient, and especially by the condition of the heart. The various ferruginous tonics, mineral acids, arsenic, strychnin, strophanthus, quinin (the latter particularly when, as is often the case, a malarial affection is responsible for the disorder), and ergot, with both belladonna and atropin, are all of unquestioned value. Crocker administered sulphur internally. Even though but temporarily serviceable, belladonna and atropin are well used at the outset of most cases. Aconite, jaborandi, and pilocarpin, white agaric (agaricin is recommended in doses of $\frac{1}{4}$ grain (0.011), repeated as required), phenol, and salicylic acid may be named as in the second rank. The narco-stimulants as a rule should be excluded.

External treatment, which is often promptly efficacious, should not be neglected in any case. The simplest method is by wiping, not

¹ Wende and Busch, *Jour. Amer. Med. Assoc.*, 1909, liii, p. 207; Parounagian, *Jour. Cut. Dis.*, 1913, xxxi, p. 515; Sequeira, *Dis. of the Skin*, 1911, p. 488.

² Lesser, *Deutsch. med. Wochenschr.*, 1893, No. 2: Flat-foot and Hyperidrosis. Cutler, *Jour. Cut. Dis.*, 1888, vi, p. 43. Hardaway and Allison, *ibid.*, 1906, xxiv, p. 127: Association of hyperidrosis with flat-foot and Morton's foot.

³ *Manual of Derm.*, 1884, p. 77.

washing, the skin-surface until it is dry, and applying a dusting-powder, such as lycopodium, talc, salicylic acid, boric acid, bismuth, magnesia, chloral hydrate (1 part to 5 or 6 of starch), or starch. Alternately with either of these, or in lieu of them, baths or lotions may be employed, aqueous or alcoholic, and medicated with corrosive sublimate, formaldehyd (1 to 5 per cent. solution), tannic acid, ferrous sulphate, naphthol (Kaposi), turpentine, zinc sulphate, alum, potassium permanganate, or common salt. Daily sponging of the affected surface with weak solutions of formaldehyd (1 to 6 per cent.) will remove the odor, and will in most cases greatly diminish the amount of perspiration, but on suspension of the treatment the condition usually returns. G. H. Fox¹ advises a lotion containing 1 part of quinin to 100 of alcohol. Van Harlingen² recommends the use of juniper-tar, phenol, and sulphur soaps with the bath as alone sufficient to relieve some cases. Grosse³ praises highly tannoform, either in powder (1 part to 2 of talcum) or as a 25 per cent. plaster.

For hyperidrosis of the feet, the treatment by the method of Hebra⁴ has deservedly high repute. It consists in neatly and completely enveloping the entire foot, the toes separately (after thorough washing and drying), in strips of cotton-cloth, over which has been spread to the thickness of a common knife-blade the unguentum diachyli albi. The parts are well bandaged, and the patient subsequently either remains at rest or pursues his vocation. In twenty-four hours the feet are redressed, without washing, after dry rubbing with charpie and a dusting-powder. This treatment is repeated daily for from ten to twenty days, after which a dusting-powder (boric acid) may be substituted for the local dressing. There occurs a parchment-like desquamation of the epidermis in thick, yellowish-brown lamellæ, beneath which is formed a new, and at first tender but apparently normal, epidermis. When the latter has lost its tenderness the feet are for the first time washed with water. In case of failure, the routine of treatment is repeated. It is scarcely necessary to add that no ill effects are known to have resulted from these therapeutic measures adopted in checking a local hyperidrosis. For the diachylon salve there may be substituted tar, ichthyol, or naphthol ointment.

Gerdeck⁵ makes three applications to the soles, at intervals of about eight hours, of the strongest solutions of formaldehyd the skin of the individual will bear. In some instances full strength is well tolerated. A few drops are put in the shoes, the influence on the leather being preservative and not destructive. Relief follows for several weeks, when the treatment may be repeated.

Morrow⁶ recommends foot-baths in the extract of *Pinus canadensis*, followed by the application of boric acid, or of salicylic acid mixed

¹ Jour. Cut. Dis., 1885, iii, p. 24. ² Handbook of Skin Dis., 3rd ed., 1895, p. 344.

³ Klin. therap. Wochenschr., 1889, Nos. 16 and 17.

⁴ Dis. of the Skin, New Sydenham Soc., 1866, i, p. 89.

⁵ La Riforma Medica, 1898, No. 38.

⁶ See his résumé of this subject in Jour. Cut. Dis., 1887, v, p. 68.

with lycopodium. Frédéricq¹ employs finely pulverized tartaric acid, applied at first with some caution, and always in small quantities. Stewart² first bathes the feet in hot water and then soaks them for a few moments (once only) in a solution of potassium permanganate, 4 to 6 grains to the ounce (0.266–0.4 to 30.), after which white-lead plaster is applied as directed above. Weiss³ highly recommends baths in strong solutions of potassium permanganate. Legoux⁴ orders pediluvia of tar-water twice daily for three days, followed by painting of the feet with a solution of iron perchlorid. X-rays have been a valuable means of treatment in many cases treated by the author. In axillary hyperidrosis we have found it useful pushed to the point of producing a slight reaction. MacKee⁵ records the successful treatment of hyperidrosis with x-rays.

Prognosis.—The future of any case of hyperidrosis is uncertain. The disease, whether local or general, may spontaneously disappear, may recur, may promptly be amenable to treatment, or may prove obstinate to all therapy. Myrtle⁶ reports the case of a male patient, seventy-seven years old, who sweated to death after repeated recurrences of severe hyperidrosis, and after temporary relief from the use of Fowler's solution. As regards these reported fatal cases, it must be said that it is extremely doubtful whether hyperidrosis *per se* has ever caused death.

ANIDROSIS.

Synonyms.—Anhidrosis. Ger. and Fr., Anhidrose.

Definition.—This name is applied to those morbid conditions in which no sweat is secreted from the surface of the body. *Hypohidrosis* and *obligidrosis* are terms more exactly used to designate a relative, general, or partial decrease in the quantity of the sudoral fluid. Anidrosis, however, often is used to indicate the latter.

Symptoms.—Diminution in the quantity of sweat excreted, or its complete suppression, whether general or local, may be a congenital or acquired peculiarity of the individual, or may be a symptom of several disorders, but as an idiopathic cutaneous affection it is rare. It occurs in ichthyosis, atrophy, and in those conditions in which destructive changes have taken place in the skin. It is common to many dermatoses, as, for example, psoriasis, erysipelas, and some forms of eczema; but in these the symptomatic character of the anomaly is shown by the fact that when the skin is relieved of these cutaneous troubles the function of sweat-secretion is restored. Similarly, in neuralgias and certain forms of paralysis a circumscribed and temporary anidrosis may be the local expression of the nervous disturbance, precisely as in the case of the symmetrical hyperidroses. Anidrosis has been observed in association with chronic nephritis;

¹ Quoted by Morrow, loc. cit.

² Jour. Amer. Med. Assoc., 1904, xliii, p. 369.

³ Jour. Cut. Dis., 1913, xxxi, pp. 101, 361, and 581.

⁴ Medical Press, February 25, 1886.

⁵ Ibid.

⁶ Quoted by Morrow, loc. cit.

in such relationship it is probably causal to some degree. Not infrequently, individuals who do not sweat are prone to display upon the skin manifestations of an erythematous or urticarial type.

Treatment.—The measures capable of stimulating the sweat-secretion are: the ingestion of water in quantity; the external application of heat; and the use of jaborandi or pilocarpin by the mouth or by hypodermic injection. In the anidrosis accompanying cutaneous disease, the indication is always primarily for the relief of the latter.

BROMIDROSIS.

Synonyms.—Bromhidrosis, Osmidrosis, Fetid or Stinking sweat. Ger., Stinkschweiss; Fr., Bromidrose.

Symptoms.—In bromidrosis¹ the perspiration when excreted has an unusual odor, or, through subsequent decomposition, develops the odor. It is often associated with hyperidrosis, but may occur independently of the latter, and like the latter also be either general or localized. The odor may be either agreeable or disagreeable, having been in various cases compared to that of certain flowers and fruits as well as to that of several stench-emitting animals. In this respect the sweat presents a striking analogy to the urine, with which it sustains a close and well-recognized physiological relation.

General bromidrosis may be physiological, as in the case of individuals of the African race, or in those with dark skins who profusely sweat during labor or in high temperatures. General pathological bromidrosis is rare. The odors emanating from the person in ulcerating syphilodermata, small-pox, malignant pemphigus, granuloma fungoides, and other disorders may in certain cases be associated with the sweat-secretion, but in other cases they doubtless are connected with the decomposition of pathological products of the inflammatory process.

The local varieties of bromidrosis affect the regions in which the sweat is oftenest secreted in excess and its immediate evaporation prevented, as in the axillæ, the groins, the feet, the ano-genital, and the intermammary and inframammary regions. In a qualitative sense, every degree of odor is noted, from that which is slightly disagreeable or offensive to the most intolerable stench. When complicated by a seborrhea, in situations where the parts are not only warm, moist, and covered by clothing, but are also subject to friction and lack of cleanliness, the most intolerable and nauseous feter is perceived. As in hyperidrosis, there may be coincident or resulting redness, swelling, and even vesiculation or superficial inflammation of the region where the symptoms are chiefly declared.

Etiology and Pathology.—The use of strong-smelling drugs, such as valerian, asafetida, or musk, has been known to produce odor-

¹ Monin, "Sur les Odeurs du Corps humain," Ann. de la Soc. de Méd. d'Anvers, Paris, 1885; abstr. Jour. Cut. Dis., 1885, iii, p. 211.

ous perspiration. A similar observation can be made regarding certain foods (onions, garlic) and drinks. It is occasionally due to emotional causes,¹ to chronic alcoholism, or to the gouty state. Systemic diseases, such as diabetes, Asiatic cholera, typhoid fever, typhus, dysentery, scurvy, septicemia, and pyemia, may impart peculiar odors to the perspiration. Neurasthenia and dietetic errors (meat-eating in excess, alcoholism) may be responsible for the affection at almost every age and in individuals of either sex. In a mild form it is common in vigorous brunettes soon after the puberal epoch and during menstruation. In bromidrosis of the feet, Thin² has recognized microorganisms (*Bacterium fetidum*) in the sweat obtained. Parkes concludes that the only cause of the disease is the covering of the feet, as soldiers with uncovered feet do not suffer from this affection. The fact is patent to every observer that sweat may be effused in a normal condition upon and within the articles of clothing worn, and subsequently generate a stench by chemical changes.

Treatment.—The treatment of bromidrosis is in general that of hyperidrosis, already described. Internally, sodium salicylate has been employed with success in 5 grain (0.33) doses. The regulation of the diet, and especially the disuse of alcohol and tobacco, is essential to the management of some cases, and the general health of the patient should always receive attention.

Locally, the indication is to remove and cleanse frequently the clothing of the part, and to make antiseptic and astringent applications. Formaldehyd solutions in the strength of from 1 to 10 per cent. in alcohol are of the greatest value. They should be followed by the external use of boric acid in powder. Thin³ successfully employed stockings and cork soles thoroughly dried after being saturated for hours in a jar containing a solution of boric acid. The efficacy of this antiseptic measure he ascribes to the fact that the odor is the result of the development of *Bacterium fetidum* in the secretions. An ointment is also employed by him for similar purposes. This is a solution of boric acid in glycerin, incorporated with a fatty basis of white wax and almond oil, making thus a "glycerated cream of boric acid." Clement Hawkins finely triturates 15 grains (1.) of red-lead oxid, and to this adds gradually 1 ounce (30.) of liquor plumbi subacetatis. This preparation is used as a lotion, following a nightly foot-bath containing 1 ounce (30.) of alum. Radiotherapy is also efficient.

Fox advises a 1 per cent. solution of chloral or of potassium permanganate as a topical application. Chromic-acid solutions in 5 to 10 per cent. strength, and potassium-permanganate solutions in the strength of 1 to 1000, may be employed. An efficacious procedure is the nightly bathing of the feet in a saturated solution of boric acid, followed by a thorough rubbing with alcohol; the feet are then dusted

¹ Hammond, New York Med. Rec., 1877, xii, p. 460.

² Brit. Med. Jour., 1880, xviii, p. 463.

³ Practitioner, December, 1881, xxvii, p. 401.

with a powder containing equal parts of boric acid and tannoform, with an addition of 2 per cent. of salicylic acid. If desired, tannoform may be used alone, or talcum, or magnesium carbonate may be added to the combination. It must never be forgotten in the management of any case that the covering of the parts affected must receive careful attention; treatment can be only partially successful if this point is neglected.

CHROMIDROSIS.

Synonyms.—Ephidrosis Tincta, Colored Sweating, Stearrhea Nigricans, Pityriasis Nigricans. Fr., Chromidrose.

Definition.—By this term is indicated the condition in which effused sweat exhibits an abnormal color—yellowish, reddish, greenish, bluish, or blackish. *Cyanidrosis* and *melanidrosis* are terms which have been employed to indicate blue and black sweating. The perspiration may be effused upon the surface already colored, or it may develop color by oxidation in the air, or it may be commingled with substances upon the surface of the skin which produce the abnormal color (bacteria, dyes, chemical agents in themselves without color). The term *pseudo-chromidrosis* is used by some to designate those forms in which, after secretion, the color is produced by the action of micro-organisms.

Symptoms.—The usual location for chromidrosis is the region of the eyes, especially the lower lids. Adjacent portions of the face may be involved by extension. The condition occurs less frequently in the axillary, crural, and genito-urinary regions, and has been observed upon the breast, back, and hands. Melanidrosis is the common form, the predominating color presenting a variable admixture of brown or blue hues. Cyanidrosis stands next in order of frequency, often modified by brown or yellow tints. The pigment material is removable with considerable difficulty, imparting to the cloth used a distinct smudgy stain. Oil rather than water facilitates the cleansing process. The color may be diffuse, or the fine, amorphous particles of pigment may be grouped so as to give a punctate appearance to the part involved. In certain forms the hairs participate in the dyschromia. Cases of red sweating are not uncommon. Hartzell¹ has seen it limited to the perineal region. Brownish-red,² purplish-red, and other shades occur. Hyperidrosis is not necessarily present. Whether the sweat is effused rapidly or slowly, the intensity of the color of the area obviously becomes greater with the accumulation of pigment. Subjective symptoms are practically absent.

Etiology and Pathology.—Any age³ and both sexes may be affected, but the subjects of the disorder are usually women of a neurasthenic type, and in view of the admitted rarity of chromidrosis the suspicion

¹ Jour. Cut. Dis., 1908, xxvi, p. 380.

² Davis, *ibid.*, p. 379.

³ Le Roy de Méricourt, first to name the disorder, describes a case of rosy sweating in an infant. Arch. gén. de Méd., November, 1857; and Bull. Acad. de Méd., 1884, s. ii, xiii, p. 425.

of dissimulation not infrequently arises. While it has been observed repeatedly in vigorous individuals, it is commonly found that the patient's general health is below par. Pelvic disorders in women have been noted in many cases.¹ Excitement through hearing good news produced chromidrosis in a patient observed by Dr. Hyde. Residence near the sea is credited with some predisposing tendency. An instance of red sweating is reported by Temple² in a patient who was taking potassium iodid for syphilis. Greenish sweating, due to the presence of copper in the system, has been reported.³ We have observed one case of this disorder in which the effect was produced by the copper plate of an electrode in contact with an abraded surface of the skin. Authors have attributed the color of the sweat to the presence of compounds of phosphorus, iron, cyanogen, hematin, chromogen, and indican in the secretion. In the case of the last-named substance, there is reason to believe that in many cases of cyanidrosis the indican is excreted in the colorless form (white) and changes to blue on the surface of the skin as the result of exudation.

At the meeting, in 1881, of the American Dermatological Association Dr. Hyde exhibited the hairs of a middle-aged man that had changed in a night from grayish-white to a greenish and yellowish-brown hue. White, of Boston, has observed similar cases of hair-coloration as the result of profuse sweating. It is possible in these instances that the chromidrosis is produced by the mechanical washing of pigment to the surface by the outpouring sweat. In the case reported by Prentiss,⁴ that of a young woman affected with an acute, purulent cystitis, whose hair, under the influence of profuse sweating induced by the action of pilocarpin, changed speedily from a light blond to a nearly jet-black hue, a similar explanation might hold, were the possibility excluded of a color-change due to the excretion in the sweat of indican-forming substances absorbed from the focus of suppuration in the bladder.

The red and yellow forms of chromidrosis are believed to be due for the most part to the presence of bacteria. In ten patients examined by Drs. Hyde and Montgomery, five of them women, the sweat was pale-red to blood-red in color, and the axillæ were the regions involved. In all the cases the microscopical examination revealed similar changes. The hairs of the axillæ were thin, pale red, brittle, and surrounded with a colloid-looking, rusty- or bright-red sheath, in places of considerable thickness and having a rough surface. This sheath consisted of red masses presenting a radiating striation, more or less confluent, apparently proceeding from fibers of the cortex of the hair, or from some broken part of its surface. The radiating striations were found to be due to an aggregation of round or ovoid bacteria, which were united in zoöglea masses by a reddish intermediate sub-

¹ New York Med. Jour., 1903, xxvii, p. 26.

² Brit. Med. Jour., August 29, 1891, p. 477.

³ Clapton, Med. Times and Gazette, 1868, p. 658.

⁴ Phila. Med. Times, 1881, xii, p. 385.

stance. Nodular swellings on the hair were produced by infiltration of the organism between the separated fibrils. The roots of the hair were free from bacteria. The red tint of the sweat was found to depend upon the numerous roundish masses of zoöglea.

Trommsdorff¹ found a yellow and a red bacterium in a case of red sweating of the armpits. He believes that microorganisms are always present in these types of chromidrosis, and that they should be regarded as special forms of *Lepothrix* (*Trichomycosis palmellina*, Pick). He is of the opinion that microorganisms will ultimately be found to be causally related in some instances to cyanidrosis.

Under the title *seborrhea nigricans*, Mitchell² describes an unusual case of chromidrosis in which there was a dark, greasy-looking discoloration of the eyelids and adjacent skin.

The relation of the sebaceous glands to the disorder is as yet not determined. In a case reported by Barié³ the palms of the hands (free of sebaceous glands) were affected. In Heidingsfeld's case⁴ the sweat-glands were normal and the sebaceous glands were absent in the part involved (left forearm).

In all cases, before accepting statements of patients as to the existence of symptoms of this character, it is needful to eliminate the possibilities of deceit and accident. Coloring matters received upon the hands may be transferred, either willfully or ignorantly, to the surface of the body. Hall⁵ reports several cases in which supposed cyanidrosis was found to be due to cheap black stockings, the dye of which, when brought in contact with acid sweat, produced a peacock-blue discoloration of the toes.

Treatment.—The treatment of chromidrosis is that of the general state of the patients exhibiting the symptoms. Attention should be directed to the gastro-intestinal tract with a view of preventing excessive indol-formation. Locally, where a parasitic source is suspected, antiseptic measures may be employed.

URIDROSIS.

Synonyms.—Ger., Harnschweiss; Fr., Uridrose.

Definition.—Uridrosis is that condition in which some of the constituents of the urine, chiefly urea, are excreted in excess with the sweat.

While a small amount of urea is to be recognized in normal sweat, this ingredient under peculiar conditions may be increased, and, together with urinary salts, be deposited upon the skin-surface after evaporation of the exuded fluid. Such symptoms have usually occurred either as the result of grave constitutional affections (such as cholera), of organic renal diseases accompanied by anemia, or of the ingestion

¹ Münch. med. Wochenschr., July 19, 1904, p. 1285 (with bibliography).

² Phila. Med. Jour., 1898, i, p. 117.

³ Annales, 1889, s. ii, x, p. 937 (with bibliography).

⁴ Jour. Amer. Med. Assoc., 1902, xxxix, p. 1519 (with bibliography).

⁵ Brit. Jour. Derm., 1902, xiv, p. 418.

of jaborandi. In a few cases the symptoms have been presented in individuals who were apparently in good health. The salts of the urine appeared upon the skins of these patients in the form of minute lamellæ, or of a fine powder of whitish color and crystalline aspect. In some cases reported the symptoms have been noted to precede by a few days a fatal issue.

The constantly adjusted equilibrium between the sweat-secretion and the urinary excretion would explain, for cases of mild type, temporary augmentation in the urea found in the sweat of unusually free diaphoresis. Geber supposes that decomposition products, such as ammonium carbonate, possibly in association with volatile fatty acids, may in part account for these conditions.

In the effort to eliminate certain substances accidentally or purposely introduced into the system, the sweat may possibly become charged with iodine, turpentine, tar, arsenic, and other substances. Several of the eruptions described in the chapter on *Dermatitis medicamentosa* are due to a similar eliminative effort, especially those accompanied by excessive sweating and the production of vesiculation. In the same manner, it may be inferred that the sweat is at times charged with excrementitious and other products of the body; as, for example, the elements of the bile. In patients affected with yellow fever, the skin and even the sweat which exudes from it often exhibit the characteristic hue of that disease. The so-called *galactidrosis*, from supposed metastasis of milk, does not occur; cases thus described have been instances of pathological sweat in the puerperal state.

Phosphoridrosis,¹ in which a phosphorescent quality has been imparted to the sweat-secretion, is reported in rare cases to have resulted from ingestion of phosphorescent fish, and in such wasting diseases as pulmonary tuberculosis, tabes, and scurvy.

Hematidrosis² (*Hemidrosis*, *Sudor sanguinea*, *Bleeding stigmata*, *Neuritic excoriations*, *Bloody sweat*), reported as observed by several authors (Foot, Ebers, Parrot), is the name applied to conditions in which blood has been seen to exude from an unbroken skin. The phenomena described under this title belong properly to the ensemble of symptoms called "hemophilia," and may in some cases be due to direct transudation of red and white blood-corpuscles and fibrin into the interepithelial spaces traversed by the sweat-pores. In a case macroscopically examined by Török red corpuscles were found in the lumen of the coil portion of the sweat-gland.³ Geber points to the neuralgic, hyperesthetic, pruritic, or emotional symptoms that are the usual precursors to the flow of pale- or bright-red blood. The fact that patients thus affected are mostly women, hysterical, dysmenorrheic, or near the puberal epoch, also throws light upon these cases. In many of them petechiæ, or signs of hemorrhage in other

¹ See Merck's case, *Wien. klin. Wochenschrift*, 1903, xv, p. 1063.

² Hyde, *Jour. Cut. Dis.*, 1897, xv, p. 557: *A Contribution to the Study of Bleeding Stigmata* (bibliography).

³ Mraček's *Handbuch*, Bd. i, pp. 416-418 with bibliography.

tissues of the body, are observed. The condition may obviously occur in any acute affection presenting purpuric symptoms.

The bleeding may occur from a single point, or from several in succession, or simultaneously from multiple stigmata. There may be a precedent elevation of the surface forming vesicles, blebs, macules, or papules; or the skin at the site of the hemorrhage may be unaltered. Gangrene has resulted in a few instances. Often pain or other sensations announce the occurrence of the bleeding.

Special caution is to be taken lest patients complaining of these symptoms solicit the hemorrhage by self-injury. In a few cases the persistence of the sanguineous flow has induced a dangerous anemia. The treatment is that indicated by the conditions present.

SUDAMEN.

Synonyms.—Miliaria Crystallina. Ger., Friesel; Fr., Miliaire Crystalline.

Definition.—Sudamen is a short-lived eruption, unaccompanied by inflammation, and characterized by vesicles containing sweat.

Three forms of sudamina have been described: (a) *sudamina alba*; (b) *sudamina rubra*; and (c) *sudamina crystallina*. The last-named is the only form to which the term sudamen is properly applied, since it alone of the three designates a purely functional derangement of the sweat-secreting apparatus.

Symptoms.—In this disorder the lesions are thickly agglomerated, but discrete, transitory, and translucent, pinpoint-sized vesicles, resembling dew-drops or seed-pearls, upon the surface of the skin, often requiring the touch to define their real character. These lesions are usually limited to certain regions of the body, as the neck, chest or other parts of the trunk, but rather more generally develop upon the front and sides of the abdomen and in the iliac regions, though they may occur upon any part. They contain each a droplet of sweat, which is removed by evaporation. Their course is rapid, both in evolution and involution, and their sequelæ are exceedingly delicate desquamative flakes, the thin roof-wall which originally covered the sweat-drops having been lifted from the superficial stratum of the horny layer of the epidermis. They are usually preceded by an attack of itching.

Etiology and Pathology.—The disease is the result of excessive sweating, induced by any cause, as violent exercise, the elevated temperature of the summer season, flannel underclothing, vapor-baths, or hot fomentations. It not infrequently follows the hyperidrosis of systemic debility, tuberculosis, inflammatory rheumatism, and the acute infectious fevers. The vesicles may occur as symptoms of the death agony.

Robinson¹ early showed that the vesicles in this disorder are always formed in the corneous layer, and that they are in direct communica-

¹ Jour. Cut. Dis., 1884, ii, p. 362.

tion with the sweat-ducts. The rete around the vesicles is normal, and their contents always sweat. The disease, in his opinion, is therefore merely an overproduction of sweat, together with some obstruction to its escape. Török¹ found the walls of the vesicles composed purely of the corneous layer, with the sweat-pore opening at the lower border of the chamber.

Diagnosis.—No difficulty can arise in making a diagnosis if the peculiar characteristics of the sudamen be kept in view. All pustular lesions have different contents; all bullous lesions are larger, or are seated on an engorged base, or they lack the crystal clearness of the sudamen, because, however transparent the contents, they are mostly covered by a thicker and less transparent roof. The halo about the lesions of miliaria rubra, or their rosy-pink shade, will determine their character. In varicella the lesions are chambered.

Treatment.—Only the simplest treatment is required. Alkaline and bran-baths may be employed, of the temperature most grateful to the skin. Afterward the surface may be dusted with one of several of the dusting-powders, such as starch, lycopodium, or boric acid, named in the chapter on General Therapeutics. The internal treatment is that indicated by the condition of the patient.

MILIARIA RUBRA.

Synonyms.—Prickly Heat, Lichen Tropicus, "Heat Rash," Red Gum, Strophulus. Fr., Miliaire; Ger., Schweissflechte.

Definition.—This is a disorder characterized by the sudden appearance of vesicles or papules, occurring, as a rule, in hot weather; being more pronounced, therefore, in tropical countries. It is accompanied by itching and burning sensations, and has a tendency to relapse.

Symptoms.—In hot weather or in tropical countries, under the influence of a high degree of temperature, the skin may become the seat of a mild, or in some cases quite severe, disorder, which primarily originates in hyperemia of the sweat-glands. It occurs commonly in those who have been sweating profusely, and particularly in those having a sensitive skin, such as infants and young adults, invalids, the gouty, and the obese. The lesions are usually pinpoint- to pinhead-sized, discrete but closely aggregated vesicles, vesico-papules, or papules.

The eruption may cover the entire surface, but is commonly best displayed in the parts covered by clothing and which are the seat of excessive sweating. The disorder is accompanied by marked tingling, pricking, and burning sensations, which are often in a high degree distressing and may solicit rubbing of the affected part, though the scratching elicited in severe itching is not common here. Minute crusts may form after vesicles rupture. Areas of diffuse redness may develop where few elements of the eruption are visible. The attack

¹ Mraček's Handbuch, Bd. i, p. 418 (with bibliography).

may be mild or severe, and may last for a few days or for a few weeks or months, the result of continuous aggravation or the production of new crops of lesions after each recurrence of the cause. The affection is not rarely complicated in obese individuals by all varieties of eczema and intertrigo.

The disorder in the heated season of the northern zones is usually scarcely more than an annoyance, while in tropical countries it may induce a severe inflammatory process in the skin.

Etiology and Pathology.—Overheating of the body from climatic effects, high temperature of rooms, excessive use of alcoholic beverages, and sweating under the influence of opium, aspirin, or other sudorifics, are the usual causes of the disease, resulting in hyperemia of the part around the sweat-gland and pore. The disorder may occur in people wearing an excessive amount of clothing, this being exemplified in the cases termed *strophulus* or "red gum," where a unilateral eruption not infrequently occurs due to excessive sweating in an infant closely swaddled. In a histological study Robinson¹ found that the papules and vesicles in miliaria rubra were due to an exudation, composed of serum, corpuscles, and some sweat, into the rete mucosum around the orifices of the sweat-ducts. The changes in the rete were similar to those met with in eczema, and the exudation came from the vessels of the papillæ. He concluded that the disease is not an inflammatory disorder of the sweat-glands, but of the skin, especially around the duct orifices.

Pollitzer² described in miliaria rubra a horny layer, swollen by imbibition and slightly edematous; the rete Malpighii contained cystically dilated sweat-ducts; and the cutis was unchanged except in the papillary layer, where the blood-vessels appeared gorged. He further described some vesicles as occurring in the rete, not connected with the sweat-apparatus. These he considers an epiphenomenon. The disorder is due to occlusion of the sweat-duct, which Pollitzer suggests may be caused by the swelling of epithelial cells unprotected by sufficient oil.

Diagnosis.—The temperature to which the skin has been subjected; the sweating, local or generalized; the character of the lesions, and their close agglomeration, all point to the nature of the malady. In papular eczema there are usually patches and a serous exudate, which stiffens linen, as distinguished from sweat-moistened but unstiffened clothing. Vesicular eczema rarely exhibits uniformity and symmetry of the resulting lesions.

Treatment.—The indications are to remove the cause, as far as practicable, and to soothe the irritated skin. Lotions and powders are preferable to ointments. The parts may be washed or wiped with starch-water, almond-meal-water, or bran-water, and then dried and thoroughly dusted with a soothing powder, such as equal parts of boric acid, zinc oxid, and starch. The use of soap should be interdicted.

¹ Jour. Cut. Dis., 1884, ii, p. 362.

² Ibid., 1893, xi, p. 50.

The bowels should be regularly evacuated, and acidulated beverages (never iced) may be ingested in moderate quantity. When medicated lotions are indicated, one may use the zinc-oxid and lime-water combinations which are useful in the treatment of acute eczema. One may also employ with advantage black wash, diluted one-half with water; weak lotions of phenol, 1 part to 250 of alcohol and water; or of the biborate of sodium, 1 part to 200. When a dusting-powder is used talcum, the stearate of zinc, or acetanilid, 1 part to 30 each of boric acid and talcum, may be employed with advantage.

MILIARY FEVER.

Synonyms.—"Sweating Sickness." Fr., Svette Miliare.

Definition.—This is an epidemic disorder, accompanied by sweating and a cutaneous exanthem. Pineau¹ gives a description of the disease as it occurred in epidemic form on the island of Oléron, in France, where, of 1000 patients affected, between 150 and 200 perished. The eruption appeared in the form of hyperemic maculæ, disappearing under pressure, after which there rapidly formed myriads of reddish or whitish, grouped, unequal-sized, acuminate papules, rising from a whitish and macerated surface. Among these papules were interspersed lesions of sudamina. The region of the face was not spared, and the conjunctivæ were occasionally affected. In the course of from two to four days pinhead- to bean-sized, varioliform but non-umbilicated pustules formed in the site of some of the papules, the contents of which disappeared by resorption. The final lesions presented were large, flat, reddish papules, the skin of the face particularly becoming reddened and swollen. In the course of from ten to twelve days general desquamation ensued, with extensive palmar and plantar losses. Relapses occurred in some cases, with diffuse redness of the surface or with the eruption of crops of reddish plaques, or yet again with the occurrence of furuncles. The sensation was that of myriads of needles thrust into the skin.

The exanthem was accompanied in some cases by fever. In the fatal cases death resulted from exhaustion.

Geber and other writers believe that the lesions described are not peculiar to any special disease, and they deny the possibility of an independent miliary fever.

HYDROCYSTOMA.

Synonyms.—Hidrocystoma, Cysts of the Coil-ducts.

Definition.—Hydrocystoma is a chronic, non-inflammatory disorder, characterized by the presence on the face of scattered, isolated, deep-seated, persistent, clear vesicles. Robinson² has published a report

¹ Arch. gén. de Méd., January, 1882, p. 25.

² Jour. Cut. Dis., 1893, xi, p. 293.

of his studies in this affection, which he first described in 1882. Reports of cases and studies of the disease have been made also by Hutchinson, Jackson, Jamieson, Rosenthal, Hallopeau, Tebel,¹ and others.

Symptoms.—The lesions are discrete or closely set, few or exceedingly numerous, tense, well-developed, clear, shining, rounded or oval, pinhead- to pea-sized vesicles, non-inflammatory, and never superficially seated—that is, never so near to the surface as the vesicles of miliaria, because the base of all hydrocystomata is to be found in the corium. They have no tendency to rupture spontaneously. The

FIG. 270



Hydrocystoma. (Howard Fox.)

lesions are whitish in color, or, when of greater age and size, are dark bluish, especially at the periphery, some resembling boiled sagu-grains. The signs of inflammation are absent; occasionally a mild hyperemia becomes evident at the periphery of a single cyst. The contents are neutral or slightly acid in reaction, and pellucid, never changing to a yellowish hue. When uninjured, the lesions resolve in time by desiccation, leaving a short-lived pigmentation. They occur chiefly

¹ Annales, 1903, s. iv, iv, p. 273.

upon the face, especially the brow, cheeks, and nose, in symmetrical distribution, and may prevail for weeks or months, or disappear in cool weather. They are always accompanied by very free sweating.

Etiology.—The disease occurs almost invariably in middle-aged women, more often in those engaged as laundresses, who have been sweating freely at their work, the face being simultaneously exposed to warm vapor. Men are very rarely affected. There is usually aggravation of the disorder in summer and either complete or partial relief in winter. Aggravation has been noted at the time of the menstrual period. One of Hutchinson's patients exhibited lesions on one side of the face only. The patients seen by us have been usually of the dispensary class, and were women who worked much over the wash-tub. Hyde and McEwen¹ reported a typical case occurring in a woman past the menopause, where sweating was one of the symptoms of exophthalmic goitre. Hallopeau describes exacerbation of the symptoms at the menstrual period, and he believes the disease is much influenced by the condition of the nervous system.

Pathology.—The epidermis, hair-follicles, and sebaceous glands are in all parts normal; the papillary layers are involved only when the cyst approaches the upper part of the corium, where "a thin plate of flattened papillary body" is found above. Below, in places, the lumen of the sweat-duct is found enlarged and distended with liquid and a granular material. The enlargement in the duct begins above the coil of the gland, and usually in the lower part of the corium. There is some perivascular leukocytosis in progress here and there in the vicinity of the vessels, but this was not a marked feature in any one of the several sections examined by Robinson. The cavities of each duct were found lined with epithelial cells. Adam² believed that the cyst developed in the coil portion of the gland, but the finding of Robinson, that the duct immediately above the gland proper is the part involved, has been confirmed by the researches of several authorities.³

Diagnosis.—The lesions of sudamen and pompholyx are readily distinguished by their superficial character and their situation, as they are rarely discovered upon the face. The vesicles of eczema are short-lived and inflammatory. In adenoma of the sweat-glands the lesions are often painful and usually firmer and larger than in hydrocystoma.

Treatment.—The lesions can be made to disappear by puncturing each, thus permitting the escape of the imprisoned fluid. A weak spirit lotion may then be applied, and this may be followed by the application of dusting-powders. Due care should be taken to avoid the effective causes of the malady.

¹ Amer. Jour. Med. Sci., June, 1903, n.s., cxxv, p. 1000.

² Brit. Jour. Derm., 1895, vii, p. 169.

³ Jarish, Hautkrankheiten, Wien, 1908; Lebel, Annales, 1903, s. iv, iv, p. 273; Pinkus, Zeitschrift, 1904, xi, p. 642; Schidachi, Archiv, 1907, lxxxiii, p. 3 (experimental production of hydrocystoma); Török, Mraček's Handbuch, Bd. i, pp. 423-426 (with excellent bibliography).

HYDRADENITIS SUPPURATIVA.

This disorder was described in 1864 by Verneuil, and since then many writers have recorded different disorders under the same name, while other observers have described similar cases under different titles. The disorder under consideration is essentially a suppurative inflammation involving the sweat-apparatus. Some cases of *folliclis* have been included in these descriptions on account of involvement in these cases of the sweat-glands.

Symptoms.—In the disorder under consideration, the common sites of the lesions are the regions of the axillæ, anus, nipples, scrotum, and labia majora. In these parts the lesions may be single or multiple. They may attack other regions, but avoid the palms and soles. The lesions resemble indolent furuncles without pilo-sebaceous involvement. Occasionally, several of the nodules coalesce and form a flat tumor with a number of openings. The disorder is chronic.

Etiology and Pathology.—As predisposing causes should be counted all conditions, general and local, which tend to lower the vitality of the tissues. The origin of the disorder is unknown, though it should probably be sought in local infection or in the action of some toxic agent excreted by the coil-glands.

The process has been shown to be a diffuse inflammation of the coil-glands and periglandular tissue, usually terminating in necrotic suppuration and destruction of the glands. Primarily, the coil-epithelium undergoes changes which are responsible for the cellular infiltration of the peripheral tissue. No microorganisms have been recognized in the cases examined.

Treatment.—The general condition of the patient should furnish the indications for treatment of each case. Locally, the nodules should be opened and dressed antiseptically. The disease is stubborn but eventually terminates in recovery.

GRANULOSIS RUBRA NASI.

The above title was given by Jadassohn¹ to a peculiar affection of the nose in children. This name is accepted today, but the disorder has been described under other headings, as: "A peculiar form of acne with changes in the sweat-glands" (Luithlen); "Perisyringitis chronica nasi," and "Dermatitis micropapulosa erythematosa hyperidrotica nasi" (Jadassohn); "A peculiar inflammatory dermatitis of the nose of young individuals, with sweating" (Herrmann); "False acne rosacea in children" (Audry); "A form of chronic erythema of the nose in children" (Dubreuilh). Since first described by Luithlen, in 1900, the number of reported cases is constantly increasing.²

¹ Archiv, 1901, lviii, p. 145.

² For report of cases and discussion of the disease in general see: Audry, Jour. Mal. Cut., 1903, xv, pp. 809-811; Baumer, Zeitschrift, 1904, xi, p. 640; Mirolubow, Deutsch. Med. Zeitung, 1906, Nos. 62 and 63; Malherbe, Jour. Mal. Cut., 1906, xvii, p. 96; Pick, Archiv, 1902, lxii, p. 105; Herrman, *ibid.*, 1902, lx, p. 77; Lebet, Annales, 1903, s. iv, iv, pp. 273-282; Pinkus, Zeitschrift, 1904, xi, p. 642; MacLeod, Brit. Jour. Derm., 1903, xv, p. 197; and *ibid.*, 1906, xviii, pp. 342-353 (excellent *résumé*); Ormsby, Jour. Cut. Dis., 1905, xxiii, p. 183.

Symptoms.—The disease is a chronic inflammation of the skin involving the cartilaginous portions of the nose, and is characterized by a more or less sharply defined area of redness, on which are scattered regularly, without definite arrangement, pinpoint- to pinhead-sized, dark-red macules and papules. Interspersed among these lesions are beads of perspiration; often the rounded papules are tipped with a roplet of sweat. The hyperidrosis of the nose is a striking feature of the disease, and there is in some cases a coincident hyperidrosis of the face and hands. Occasionally, vesicles are found containing a clear droplet of fluid; when these are large and deeply seated, they are not to be distinguished from the lesions of hydrocystoma. The redness of the area involved ranges from pale pink to a purplish hue; the color of the lesions fades on pressure. The nose is cold to the touch, but subjective symptoms, aside from slight itching, are absent. There are usually to be found evidences elsewhere of impaired peripheral circulation.

Etiology and Pathology.—The patients are usually children ranging in age from six months to sixteen years. A few cases have been reported in adults. Both sexes are about equally affected, the individuals being for the most part delicate children with poor circulation. Hereditary influences have been traced in some instances.

The histological changes are those of inflammation situated in the corium. The superficial blood-vessels are dilated; about them, and also about the sweat-ducts, is an infiltration consisting of leukocytes, connective-tissue cells, plasma-cells, and occasionally mast-cells. A few leukocytes may be found in the dilated interepithelial lymph-spaces of the rete. The pilo-sebaceous follicles are usually normal. If the infiltration about the sweat-duct is marked, a cyst of the proximal portion of the duct may be found, as in hydrocystoma.¹

The essential factors in the production of the disorder are not positively recognized. It is probable that vascular disturbances are the primary elements in causation. Hallopeau² regards the disease as a neuro-hyperidrosis, due to disturbances of the vaso-dilators and vaso-constrictor nerves.

Diagnosis.—The disease has been mistaken for lupus vulgaris, because of the gross appearance of the papules. In the disorder under discussion the lesions disappear under pressure, there is no tendency to ulceration, and marked hyperidrosis is present. From acne vulgaris and rosacea it may be differentiated by the absence of involvement of hair-follicles and sebaceous glands.

Treatment.—Treatment is usually not very effectual. The general health should be improved by proper hygiene and the administration of indicated internal medication. Locally, astringent powders, lotions or pastes containing resorcin, salicylic acid, or ichthyol, may be tried. Tannoform as a dusting-powder has been used with considerable suc-

¹ Lebet, Pinkus, loc. cit.

² XV Internat. Med. Cong., Lisbon, 1906. Ref. in Zeitschrift, 1906, xiii, p. 573.

cess. Relief by these applications is usually temporary, but complete disappearance of the disease may be looked for when the patient attains maturity.

DISEASES OF THE SEBACEOUS GLANDS.

SEBORRHEA.

Synonyms.—Steatorrhea, Acne Sebacea, Dandruff, Seborrhagia. Sebaceous Flux, Stearrhea. Ger., Schmeerfluss; Fr., Séborrhée.

Definition.—The clinical phenomena which should be included under the title "seborrhea" are at present matters over which differences of opinion exist. Since the time when Unna first placed under the caption of "eczema seborrhoicum" a number of conditions which had previously been classed with seborrhea, the tendency has been toward a constant increase in the former category at the expense of the latter. In the recent work of Sabouraud, which has been accepted by many investigators, the only conditions described under the latter term are those which are clinically non-inflammatory. All seborrhoic disorders which clearly show evidences of inflammation are considered under the term "dermatitis seborrhoica."

Seborrhea has heretofore been described as occurring in two varieties: seborrhea oleosa and seborrhea sicca, the latter being subdivided into the dry, scaling, and crusting forms. The simplest division from a clinical standpoint, and, if the conclusions of Sabouraud are confirmed, also from an etiological standpoint, would be to separate the symptoms formerly described under seborrhea sicca into two divisions, namely: pityriasis simplex and pityriasis steatoides, which would leave seborrhea oleosa as the sole representative of the seborrheas. The term "pityriasis," however, hardly seems compatible with some forms of the disease.

Seborrhea Oleosa.—This form of seborrhea, variously known as hyperidrosis oleosa (Brocq), seborrhea simplex (Unna), stearrhea simplex (Wilson), and *acné sébacée fluente*, is characterized by the presence of an excessive amount of oily secretion on the scalp, face, and some other regions of the body. The sebaceous secretion is exuded as an oily fluid upon the surface both of the hairy and non-hairy parts of the skin. In the former situation, both in adults and infants, the free oily substance is seen to cover as a coating both skin and hairs, and, especially in adults who have suffered much loss of hair as a result of the sebaceous disorder, to produce a glistening and shining appearance of the scalp. This is the form of seborrhea responsible for permanent baldness. In women with long hair the locks are often matted together in a glue-like paste. The same greasy layer may be seen over the non-hairy portions of the skin, especially about the nose, forehead and cheeks. Free drops of oil can occasionally be wiped from such surfaces with a handkerchief. The ducts of the sebaceous follicles here are either patulous or plugged with sebum, which may be squeezed out, appearing as worm-like bodies. The skin-

surface may be slightly reddened or be pallid, but it is usually cold to the touch. The oily substance serves to entrap particles of dust and soot floating in the air; thus a peculiarly dirty or even blackish hue of the face is often produced. This form of seborrhea, though most common on the face and scalp, may occur on the chest, the back, the pubes, the genitals, and rarely on the other parts of the body. In the negro, in whom the sebaceous glands are usually well developed and active, the oily form of seborrhea is common, and the flux at times is practically physiological. Subjective symptoms in seborrhea oleosa are usually slight, though a moderate amount of itching is commonly present.

Seborrhea Sicca.—Seborrhea sicca varies greatly in its manifestations, but in general its features may be divided into the scaling and the crusting forms of the disease. The scaling form, variously known as *seborrhea furfuracea* or *pityriasisiformis*, *pityriasis simplex*, *eczema seborrhoicum*, and *eczema squamosum*, is most common on the scalp, in which region it is popularly known as "dandruff." Seborrhea capitis in its commonest form (*pityriasis simplex*) is recognized in the adult by the formation on the scalp of fine, branny, slightly greasy, white or grayish scales, which may be so abundantly shed as to fall freely and cover the shoulders of the patient whenever the hair is brushed or otherwise disturbed. At other times these fatty scales are more or less adherent to the scalp-surface, or are piled up in laminæ one upon another. These scales may mat the hairs to the scalp or be disseminated through the mass of the hair, some of the hairs penetrating a flattened, greasy scale, as a twig might be passed through the centre of a leaf. In consequence of their deprivation of unguent, the hairs to which the affected glands are accessory become dry and lustreless.

The affection may be circumscribed, and exhibited in conspicuous patches covered by scales; or it may extend uniformly over the entire surface of the scalp; or, as is frequently noticed, may fringe the brow at the line of the hairs and then extend chiefly over the vertex, being conspicuous at the line where the hairs are parted from vertex to brow. Beneath the scales or crusts of dried sebum the scalp is usually lustreless and of a slate-gray color. The disease not infrequently extends from the scalp to the adjacent portions of the face, neck, and ears. In these situations the skin may be slightly reddened, while the scales are thin, adherent, and not very abundant. The eyebrows, the region covered by the beard, and the pubic region may be affected, although less frequently, in the manner described above. In the latter region the itching is often more severe than occurs when the disease is limited to the scalp. The disorder may appear on the portions of the face more distant from the scalp, and on other parts of the body, in the form of dry, roughened patches, which scale more or less, but which are only slightly, if at all, reddened. On any of these surfaces the condition may shade insensibly into those described under dermatitis seborrhoica.

The crusting forms of seborrhea may occur on any of the hairy or non-hairy parts of the body, but are most common on the scalp and face. In the scalp large, waxy, greasy, yellowish scales and crusts, associated with itching and alopecia (*pityriasis steatoides*), may occur. The so-called "waxy" form is represented by the physiological *vernix caseosa* of the newborn infant, and by the more or less adherent, dirty-yellowish cap often long surviving upon the vertex of young infants. Occurring later in infancy, the disease is known as "milk-crust," or as *crusta lactea*. This may merely be persistence of the dried *vernix caseosa* about the vertex in the newborn, or it may occur in scalps which have been perfectly cleansed after birth. The crust differs somewhat in color with the tint of the child's complexion, and may vary from a light yellow to a dark brown; it may be thick, greasy, and mat the hairs; or be thin, dry, and friable. Inflammatory complications are very prone to develop from decomposition of the material making up the crust, in which event the disorder becomes properly a dermatitis seborrhoica. The region of the brow, the surface covered by the beard of the male, and the pubic region may be involved in this type of the disease, though less frequently than in the furfuraceous form.

On the face, this form of seborrhea is characterized chiefly by the accumulation of thick, dirty-yellowish and even yellowish-black accumulations of sebaceous matter, often adherent to the surface and disfiguring the features by the mask produced. This condition is conspicuous about the nose, where the disease is at times symmetrically disposed. The crusts once removed, the skin beneath is generally found to be pallid or slightly reddened, with the orifices of the sebaceous ducts patulous; while the under surface of the separated crust is seen to project downward in corresponding delicate prolongations, comparable to stalactites. The crusts rapidly reform when the disease is not arrested. They are found in the furrows on either side of the nostrils, on the brows, the cheeks, and the pavilion of the pinna of the ear. They are most common at the puberal epoch in both sexes, when the sebaceous glands of the skin are in a state of developmental activity.

Seborrhea may affect the eyelids, in which situation a mild dermatitis seborrhoica usually supervenes, owing to the trauma of rubbing and the incessant movement of the skin in winking. The lids are then reddened, slightly swollen, and in various degrees covered with minute crusts (less frequently with scales). The eyelashes often fall, and in cases of long standing their loss may be permanent, owing to atrophy of the follicles.

Seborrhea of the umbilicus assumes special features in that the fatty matters in this region are remarkable for their tendency to speedy decomposition, with the production of an exceedingly fetid odor and a mild degree of seborrhoic dermatitis.

Seborrhea of the genitals in men is usually located in the sulcus behind the corona glandis, though in individuals with a tight or a redundant prepuce it may become more extended. In women, the

accumulation occurs about the clitoris and vestibulum, though the external labia may be covered with the secretion in various degrees of fluidity. The smegma preputii, supplied by the glands of Tyson, may thus be a source of trouble either by its retention, or by its secretion in abnormal quantity or quality. In either event, the tendency is to decomposition, fetid odor, and subsequent irritation, which may lead to an inflammation of severe grade.

Etiology.—Seborrhea, except that form which appears in infancy, is most frequent at the age of puberty or adolescence—that is, at the time of greatest activity of the glands. It may appear, however, at any age. It occurs about equally in both sexes. The commonest seats of the disease are: the scalp, the face, the genital region, the dorsum of the body between the scapulæ, and the anterior surface of the chest; all of these are regions where the oil-glands are especially numerous and well developed. Seborrhea oleosa is found more frequently in persons of dark complexion, while seborrhea sicca is more common in blondes. A family tendency to seborrhea of the scalp, with the resulting alopecia, may often be noted.

Among the predisposing causes may be counted all systemic disturbances which lower the vitality and general nutrition. Seborrhea may thus follow acute infectious diseases, and frequently appears during the course of chronic exhausting diseases, such as syphilis or tuberculosis. Constipation, indigestion, sedentary habits, and the excessive use of alcohol and tobacco, may be classed as predisposing factors. The disease occurs, however, in individuals who are apparently in excellent health. Among the local predisposing causes are the wearing of stiff, heavy, and ill-ventilated hats, and the failure properly to care for the scalp. Women with long hair are generally obliged to bestow special attention upon the scalp. Men with short hair attend chiefly to its disposition upon the head, and because this is so easily accomplished often neglect the care of the scalp. Such neglect is followed frequently by seborrhea sicca (*Pityriasis simplex* and *Pityriasis steatoides*). Both varieties of seborrhea are frequently found, often with inflammatory complications, in nuns, with whom the scalp, ears, and neck are encased snugly in stiff, unventilated headdresses.

While there is much, both in clinical experience and in laboratory findings, to commend the theory that the disease is of parasitic origin, the definite organisms have not been decided upon. Those thus far isolated and described have not been universally accepted.

Pathology.—As a rule, at puberty, and in some individuals throughout their lives, the quantity of oily sebum excreted is larger than usual, and it is not always possible to draw sharply dividing lines between the physiological and the pathological process. In the dry form of seborrhea, the secretion is dryer than usual and mixed with cells exfoliated from the ducts of the glands and hair-follicles, and with imperfectly metamorphosed cells from the glands themselves. Unna¹

¹ Brit. Jour. Derm., 1894, vi, p. 257; and Histopathology, p. 222.

believes that the skin is lubricated by oil from the coil-glands, and that in seborrhea oleosa (which he terms *Hyperidrosis oleosa*) the secretion is practically all furnished by them, the sebaceous glands being involved, if at all, secondarily. Beatty¹, on the contrary, states that the coil-glands do not furnish the oily secretion in this condition. Sabouraud² concludes that seborrhea oleosa (also comedo, acne, and alopecia areata) is due to an inflammation of the sebaceous glands, caused by a definite microbacillus, which is found within a cocoon-shaped mass of epithelium at the neck of the follicle.

It is generally believed that the coil-glands secrete fat, but how much they supply and what part they play in seborrhea are unsettled questions. The fact that seborrhea is most frequent and most pronounced in regions where the sebaceous glands are largest and most numerous is fairly good evidence that these glands, more than the sweat-glands, are active in the production of the disease.

According to Sabouraud,³ the sequence of events is as follows: Pityriasis simplex capitis is produced by the bottle bacillus (Unna) or spores of Malassez.⁴ In this form, occurring in children, there is a dry, scaling process (dandruff), in which the scales fall abundantly, and the hair but little. At this time the scales show the process to be hyperkeratotic, and not inflammatory. At puberty, when hyperactivity of the sebaceous glands is present, a second factor is added, the polymorphous coccus, producing gray colonies (Unna's morococcus). The process now becomes more greasy, the scales form adherent, yellowish, waxy crusts, and the condition is transformed into the second-grade pityriasis steatoides. Now there is added from a pathological standpoint a perivascular cellular infiltration in the corium, with edema and parakeratosis. Finally, a third factor is added, the microbacillus of Unna and Sabouraud, and an oily seborrhea is the result. This form terminates in marked loss of the hair. At this time the sebaceous glands show hypertrophy, with degeneration of the hair-follicle, which accounts for the hair-loss.

Seborrhea oleosa may occur independently of the other processes above described, and the sequence of events above noted may also occur at different ages.

As to the specificity of the organisms, no uniformity of opinion exists. Jackson and McMurtry⁵ are not convinced that the microbacillus is responsible for seborrhea, and Whitfield⁶ is of the same opinion. Moreover, the sebum retained in the follicles furnishes an excellent culture-medium for an unusual development of the micro-

¹ Brit. Jour. Derm., 1894, vi, p. 161.

² Brit. Med. Jour., 1901, ii, p. 858; and *Les Maladies du Cuir chevelu*, Paris, 1902.

³ Loc. cit. Cf. excellent description by Jackson and McMurtry, Jour. Cut. Dis., 1912, xxx, p. 608; also, *The Diseases of the Hair*, pp. 298-323.

⁴ Kraus (Archiv, cxvi, p. 723, with plates showing the bacillus as a fungus; abstr. Brit. Jour. Derm., 1913, xxv, p. 293) believes the organisms described as bottle bacilli are not of one type. Some forms appear to be true moulds, while others seem to be sporoidal elements of mycelial fungi.

⁵ Loc. cit.

⁶ Allbutt and Rolleston's System, 1911, p. 8.

organisms which may be found on the scalp in normal conditions. Schamberg¹ has demonstrated Sabouraud's microbacillus in the follicles of individuals having no signs of seborrhea or of other diseases of the sebaceous glands.

Unna and Elliot state that the microscope shows inflammation to be present in all but the simple oily form of seborrhea. As stated before, it is difficult to draw sharply dividing lines between the types here described, which clinically show little or no evidence of inflammation, and the distinctly inflammatory forms described as dermatitis seborrhoica.

Diagnosis.—Seborrhea is to be distinguished from eczema, dermatitis seborrhoica, ichthyosis, impetigo, psoriasis, syphilis, and trichophytosis capitis. The distinctly inflammatory character of the first two serves to differentiate them. In ichthyosis, the scale is dry and non-greasy; and the disease is congenital, and usually involves the entire body, whereas seborrhea is generally acquired and is rarely universal. Crusting impetigo of the scalp might be confused with seborrhea; the former is an acute disease; its lesions are comparatively small, circumscribed, and isolated; the crusts differ in character from the sebaceous matter formed in seborrhea; and the skin beneath is reddened and evidently the seat of an exudation. Psoriasis of the scalp may be recognized by the presence of typical patches upon the body; the scales are lustrous, larger, and not greasy unless some fatty application has been made to soften them; they cover a reddened integument; and alopecia is not produced even in persistent cases. Some of the pustular syphilodermata located upon the scalp and face, if observed only in the stage of crusting, might be confounded with seborrhea; but the history of the case, the discovery of other signs of syphilis, such as adenopathy, or mucous patches, the character of the secretion, the condition of the surface beneath the crusts, and the small size, more definite outline, and characteristic grouping of the lesions, should point to the identity of the disease. Trichophytosis capitis may be recognized by the non-greasy character of the scales upon the affected patches, which are usually circumscribed and circular; the hairs in the areas involved are fragile and often appear as broken-off stumps, in which the presence of the parasite is shown by the microscope.

Treatment.—The general and internal treatment of seborrhea should be varied to meet the requirements of the individual case. The preparations most often indicated are: iron in the case of anemic young women, cathartics in sluggishness of the bowels, and cod-liver oil and the bitter tonics when there is impairment of nutrition. Arsenic, employed in the manner suggested by Sir Erasmus Wilson, is praised by Hebra:

R—Vin. ferri,	f ʒjss;	45	M.
Liq. potass. arsenit.,			
Syrup.,	āā f ʒij;	8	
Aq. dest.,	f ʒij;	60	

Sig.—A teaspoonful to be taken three times daily with the meal.

¹ Jour. Cut. Dis., 1892, xx, p. 99.

In many cases the acid-iron mixture of Startin, or some modification of it, admirably meets the indications:

R—Magnes. sulph.,	℥ij;	60
Ferri sulphat.,	℥ss-℥j;	0.66-1 33
Acid. sulph. dilut.,	f℥ij-f℥iv;	8-16
Infus. quassie,	ad f℥iv;	120 M.

Sig.—A teaspoonful in water, to be taken through a tube after eating.

Throughout the treatment the physician should insure a careful observance of the laws of hygiene. Sunlight, nutritious food, and open-air exercise are not to be disregarded. When the scalp is involved, the patient should be encouraged to discard the hat as far as possible consistently with the circumstances in which he may be placed, and thus promote the favorable action of light and air upon the part affected. In cases in which it can be tolerated, daily cool salt-and-water sponging of the entire body-surface, followed by brisk friction, as described under the treatment of acne, may be employed with great advantage.

The first indication to be met by local treatment in seborrhea is the removal of the crusts and the fatty matters accumulated upon the surface. It is always well to warn patients, especially if the disorder be upon the scalp in an aggravated form, that a considerable loss of hair will result. Many of the hair-filaments are so impoverished by the disease and so loosened in their follicles that a complete cleansing of the scalp-surface will bring the hairs away in quantities sufficient to threaten speedy baldness; and it is not rarely the case that patients attribute this to the treatment rather than to the disease. The fatty accumulations are first to be soaked with some oily fluid to facilitate their removal; for this purpose olive oil, vaselin, almond oil, glycerin, or lard is usually employed. The substance selected should be used in quantity sufficient to permeate all crusts. It may be poured over or be rubbed into the scalp several times in the twenty-four hours, and at night a flannel or other cap should be worn. In the case of children and infants, gentleness is required in thus treating the scalp, especially in the subsequent washings, lest the surface be irritated. In women it is rarely necessary to cut the hair. As soon as the soaking with oil is complete, the crusts are to be removed by washing with soap and water, though when the accumulations are bulky, the masses may be gently removed with the fingers or a comb. When the scalp is tender, ordinary toilet or Sarg's glycerin soap may be applied with warm water; but it is usual, in the case of adults, to employ the well-known tincture of green soap. The surface should be thoroughly sponged with the tincture, and then warm water added until with gentle rubbing a lather is abundantly produced over the scalp, when an excess of water is finally used to cleanse the part of crusts, oil, and soap. The scalp and hairs are then thoroughly dried and anointed with some bland, fatty substance, if the exposed surface be tender and irritable; if not, with some stimulating pomade or lotion.

In cases in which milder effects are required, the scalp may be washed with water containing such alkaline substances as borax, ammonia, or potassium carbonate. The popular prejudice against these articles is based upon the abuse of strong alkaline lotions in the hands of inexperienced persons. Such lotions may readily be tested by the tongue before use upon the scalp. They should in all cases be followed by an oily or greasy application, medicated to meet the requirements of the case. Tar-soap may be used at times with advantage for cleansing the scalp. The compound tincture of green soap of the National Formulary (1906) is a preparation so medicated, and may be applied in the same manner as the simple tincture.

After the use of soap and water, which may be repeated as often as need be (daily, at intervals of several days, or once a week), the scalp is to be thoroughly anointed. For this purpose olive oil, cod-liver oil properly scented, almond oil, vaselin, or glycerin and water may be used. Van Harlingen recommends, as a substitute for other oils, the oleum sesami (oil of benne), since it does not dry and clog as do the former. An ounce (30.) of this oil, rubbed up with 5 grains (0.33) of powdered benzoin, and digested for three hours over a water-bath, with the addition of 3 drops of absolute alcohol, and filtered, furnishes an excellent basis for oily mixtures to be used on the scalp. Any of these applications can be made conveniently with a medicine-dropper. Crocker advocates the use of a lotion containing acetic acid prior to the application of oily preparations to the scalp, the object being to aid the penetration of the remedy.

In the place of oils after these ablutions, pomades are often used with more advantage. For this purpose vaselin, lanolin, lard, and cold-cream ointment furnish the best bases. To obtain the desired consistency, any one of these may be used alone or in combination with the others or with an oil.

Of the many substances employed and recommended as medicaments for these pomades, sulphur, resorcin, salicylic acid, the red oxid, red sulphid of mercury and the ammoniated mercury are most serviceable.

Sulphur is of great value in the treatment of all sebaceous-gland disorders: in the form of an ointment, 15 grains (1.) to a drachm (4.) to the ounce (30.) of vaselin or other ointment-base. One-half or the same quantity of resorcin may often be added with advantage to the pomade. The alterative effect of the mercurials is also as evident in seborrhea as in many other cutaneous disorders. At the head of the list, for this special purpose, stands the red mercuric oxid in strength of from 2 to 4 grains (0.133-0.266) to the ounce (30.) of ointment; but ammoniated mercury, and calomel in the proportion of from 5 to 10 grains (0.33-0.66) to the ounce (30.), may be often substituted for the former with advantage. The tars are useful in many obstinate cases; oleum rusci may be added in the strength of from 1 to 10 parts to any of the salves recommended above. Ichthyol in ointments in the strength of from 5 to 10 per cent.

has also proved efficacious. An excellent formula for the scalp is the following:

R—Sulphur. præcipit.,	3j;	4	66 M.
Lanolin. anhydrous,			
Glycerin.,			
Aq. rosæ,	aa 3ijss;	10	
Saponis,	3ss;		
Sig.—Ointment for scalp.			

Lotions are well adapted to some cases. They are cleanly and easy of application, and are more pleasing to most patients, especially to women with long hair. Their efficacy is often enhanced by the addition of a small amount of oil. Mercuric chlorid is admirably adapted for use in lotions; so also are the tinctures of cantharides, capsicum, nux vomica, and the salts of quinin. A good formula is as follows:

R—Resorcin.,	3ijss;	10	133
Hydrarg. chlorid. cor.,	gr. ij;		
Ol. amygdal. dulc.,	3ij;	8	
Tinct. cantharid.,	3ij;	8	
Alcoholis,	3ij;	60	180
Aq. dest.,	q. s. ad f 3vj;		
Sig.—To be rubbed into the scalp.			
			M.

For this may be substituted $\frac{1}{2}$ ounce (15.) of resorcin in 2 ounces (60.) of alcohol and 6 ounces (180.) of rosewater.

Often the combined use of a pomade and a lotion is advantageous. A convenient procedure is to have the patient shampoo the scalp once a week; after the hair is dry a pomade suitably medicated is applied with the finger-tips, and on each of the intervening six days before the next shampoo a lotion is employed upon the scalp with the aid of a medicine-dropper.

Repeated applications and patient care of the scalp are necessary to secure complete relief in the case of a disease as essentially chronic as seborrhea. At times the local treatment may be changed with advantage. Not infrequently, too vigorous treatment is followed by a more or less acute dermatitis. In this case stimulating preparations should be replaced by soothing ointments or lotions until the induced inflammation has subsided.

The treatment outlined above for the hairy portions of the body may be used with success also for the relief of seborrhea of the non-hairy portions, especially the face. Here, it will be observed, the crusts have a tendency to reform, and the most persistent treatment is necessary to secure permanent relief. Occasionally, after cleansing the surface with soap and spirit-lotions according to the indications of each case, it is of advantage to apply the ointment selected for subsequent application, not only by gently smearing it on the parts with the tips of the fingers (always the most effective method), but also by spreading it on a compress, which, for the night at least, may be fixed in contact with the part. Unna's lead-plaster mulls, used for this purpose in Germany, may be fairly well imitated by drawing strips of cheesecloth

through heated diachylon ointment and then smoothly smearing them with the same material. When the tendency to reformation of the crust is abated, one or more of the dusting-powders may at times be employed with advantage for the purpose of protecting the skin or of exercising upon it an astringent effect. Sulphur and salicylic acid are especially valuable in these dusting-powder combinations.

Seborrhea oleosa is best treated with lotions or with powders. Should the skin become irritated under these applications, ointments may be substituted for a time.

Astringent lotions or powders containing tannin, zinc sulphate, zinc oxid, bismuth subnitrate, sulphur, salicylic acid, or tannoform are often serviceable.

The local treatment of seborrhea of the genitals is somewhat different. Ointments rarely answer well in disorders of the mucous surfaces, and green soap is too irritating for similar employment. Here washing with a good toilet-soap and warm water is sufficient for the purposes of cleanliness, and diluted lotions containing alcohol, in the form of whisky, brandy, or aromatic wine, suffice. These lotions can be made astringent with tannin, alum, or zinc sulphate, and when there is pain or tenderness opium may be added. In this form of the disease, as also in seborrhea of the umbilicus, phenol or chlorinated soda may be necessary to correct fetor. After the employment of these lotions boric acid with talc (1 to 4) or zinc oxid (1 to 8) may be dusted over the part.

Prognosis.—In forming a prognosis in cases of seborrhea of the scalp, it must be remembered that the disease is frequently obstinate, and shows a decided tendency to recur unless some treatment be continued for weeks or months after the scalp is apparently well. The resulting loss of hair, if symmetrical, may be remediless, but much may be done in the way of saving the hair which is left. Facial seborrhea is much more amenable to treatment; seborrhea of the genitals and the umbilicus is an entirely manageable disease.

DERMATITIS SEBORRHOICA.

Synonym.—Eczema Seborrhoicum.

Duhring was the first observer to show that a type of inflammation of the skin, to which he gave the name seborrhea corporis, was closely allied and usually consecutive to seborrhea capitis. Later, Unna¹ advanced the theory that a single morbid process, to which he gave the name *Eczema seborrhoicum*, was responsible for a number of varied clinical manifestations which had previously been considered separate disorders. Under this title he included seborrhea sicca (or pityriasis) of the scalp, face, and body, some chronic circumscribed forms of eczema, and many cases which most observers still believe are forms of psoriasis. In America Elliot has furnished an excellent presentation of the subject.²

¹ Monatshefte, 1887, vii, and Histopathology.

² Morrow's System, iii, p. 273.

Though Unna gave *eczema seborrhoicum* a wider range than is accepted by the majority of dermatologists, there is little doubt that the most of the phenomena he describes under that title are intimately related etiologically and pathologically. It must be said that the tendency today is toward his position, though it is doubtful if his views in their entirety will ever attain full acceptance. Following Unna, the term by many authorities is made to include certain seborrhoic disorders which are non-inflammatory, in the sense that the clinical signs of inflammation are absent. These same disorders, however, may show histologically distinct, though perhaps slight,

FIG. 271



Dermatitis seborrhoica.

evidences that the pathological process is inflammatory. It is manifestly not easy to mark accurately the dividing line between the inflammatory and the functional in these instances without the aid of the microscope. As the term itself implies an inflammatory complex, the expedient course would seem to be to make the division between seborrhea and *eczema seborrhoicum* purely clinical; in other words, to place in the former group those disorders which show no clinical sign of inflammation, reserving for the latter group those which are manifestly inflammatory.

Many of the conditions described under *eczema seborrhoicum* arise from the implantation of an inflammation upon an ordinary seborrhea,

as the result of some form of external irritation. Prominent among these exciting factors must be mentioned the decomposition of the excessive sebaceous secretion upon the uncleansed or improperly cleansed skin; but it cannot be denied that any dermatitis, produced by whatever irritant, may, in individuals with a tendency to functional disturbances of the sebaceous glands, take on a seborrhoic character. This fact, viewed in the light of the present-day conception that the difference between eczema and dermatitis is largely etiological, argues in favor of a change in nomenclature from eczema seborrhoicum to dermatitis seborrhoica.

FIG. 272



Dermatitis seborrhoica.

The eczema seborrhoicum of Unna, therefore, narrowed by the elimination of clinically non-inflammatory forms, is here described under the name Dermatitis seborrhoica.

Symptoms.—Dermatitis seborrhoica almost invariably begins on the scalp, and often remains limited to this region, though frequently it extends to the ears, temples, forehead, neck, and adjacent parts. The disease is not uncommon on other parts of the body where the sebaceous glands are large and abundant, as in the sternal, interscapular, inguino-scrotal, axillary, and umbilical regions. It may appear, however, on any part of the body, and in rare instances is universal. The disease is extremely variable in its course and mode of extension.

It may remain confined to the scalp for years and then extend to adjacent surfaces, or appear on portions of the body distant from the scalp, leaving the intervening surfaces unaffected. Such spreading of the disease may be very rapid, or so slow as to be almost inappreciable; while the lesions may be numerous, extensive, and acute in type, or few, scattered, and indolent in character.

The affection varies considerably in appearance in its different phases, and especially in different regions. In the scaly form, which is the most common, there is a scanty or abundant formation of fine, branny scales; the skin is somewhat reddened, and often has the peculiar yellowish color which is characteristic of the disease. The scales may be large and abundant, and heaped up in dry, adherent masses, simulating those sometimes seen in psoriasis; but in such cases the scales are usually somewhat fatty. Frequently, there is a coexisting seborrhea oleosa, with the formation of yellowish to brownish, soft, greasy, and non-adherent masses, suggesting crusts rather than scales, under which the skin is more or less reddened and the mouths of the follicles patulous.

The disease often appears in the form of oval or rounded macules and patches, or as small, scale-capped papules, which may remain discrete or may coalesce to form slightly elevated plaques. The macules, papules, and plaques are sharply outlined, and patches that are spreading peripherally frequently present a circinate border with a fading yellowish centre. By the coalescence of several such areas polycyclic, gyrate bands may be produced. The color of the lesions is reddish or pinkish, modified by the yellow tinge that is nearly always present. Scaling and crusting in varying degrees are usually present, as in the more diffuse forms described above. The lesions may occasionally be moist over all or part of their surface, but the characteristic vesicles and pustules of eczema are absent, and the discharge when present is usually distinctly greasy. Of the varied manifestations of the disease, the scaling forms are the most common, but in a given case the type may change gradually or rapidly, and multiformity of lesions is not unusual. Itching is usually slight and may be absent.

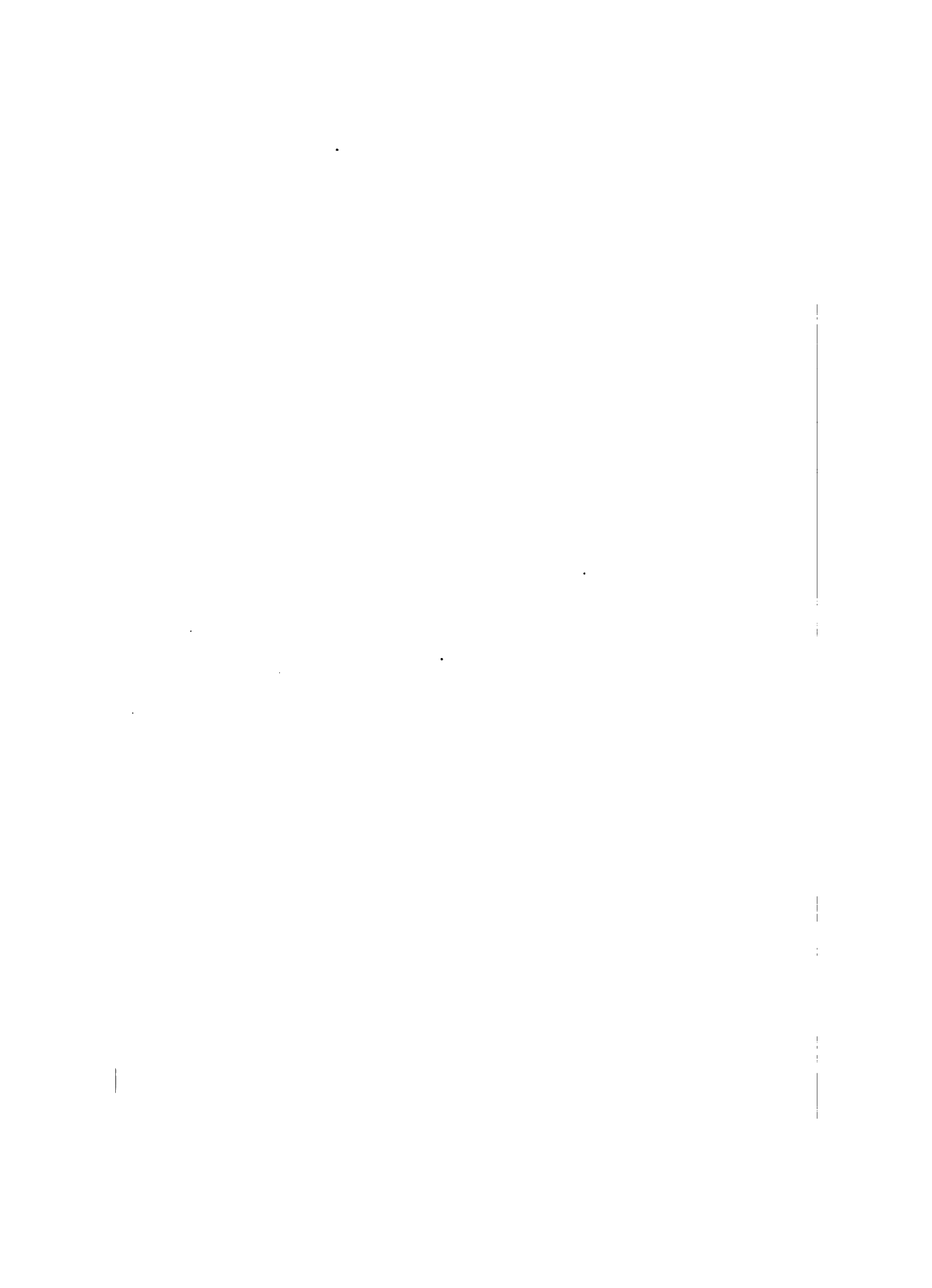
On the scalp the onset of the disorder is particularly insidious and often unnoticed until attention is attracted to it by a thinning of the hair, moderate or really annoying itching, and a scanty or abundant formation of scales over more or less of the surface. In the early and mild forms the condition is practically that described under seborrhea sicca; the point of emergence from the latter condition into a dermatitis seborrhoica is here considered as marked by the appearance of the clinical characteristics of inflammation. The vertex is the usual site of the affection, but the entire scalp may be involved. The scales may appear in any of the forms described above, but are usually fine, dry, grayish, and slightly greasy. The lowest layers of the scales are usually firmly attached to the underlying surface, which, at first dry, lustreless, and pale, becomes more or less hyperemic. After the condi-

PLATE XXXV



Photo by Oram.

Dermatitis Seborrhoica. (Stopford Taylor.)



tion has existed for a time, alopecia is noticed, while the hairs of the affected regions are dry and lustreless. The condition may persist for months or years with but slight change. In more severe forms the heavier masses of scales and crusts described above may occur upon distinctly reddened or moist patches. Seborrhea oleosa may complicate the process, with its characteristic greasy crusts and oily condition of scalp and hair. Itching is usually quite severe, and the inflammatory features of the condition are aggravated by the trauma of scratching. In infants and occasionally in adults a genuinely acute dermatitis may supervene, involving portions or all of the scalp and usually extending to the adjacent parts of the face. The condition known as "milk-crust" (described under Seborrhea) passes into a form of dermatitis seborrhoica when inflammation is produced by irritation from decomposition products in the material accumulated upon the scalp. In adults circumscribed, oval or circinate, reddened, and scaling, moist, or crusted patches may appear, chiefly at the nape of the neck and about the temporal and parietal regions, often extending to the ears and portions of the face. Occasionally, a sharply defined, red band, more or less covered with scales or small crusts, may be seen at the margin of the hair, especially on the forehead and on the neck. Such bands closely resemble those of psoriasis, but usually have a more regular and even outline, much less infiltration and thickening of the skin, and they lack the characteristic scales and outlying separate lesions of psoriasis.

The ears and the surfaces surrounding them are, after the scalp, more frequently involved than other parts of the body. Any of the above-described types of the disease may be seen in this region, the moist and crusting forms being quite common, especially back of the ears, where fissures frequently occur. The disorder not rarely affects to a very marked degree the lining of the external meatus of the ear, blocking it with crusts and interfering seriously with hearing.

The beard, moustache, eyebrows, and pubes may present symptoms differing but slightly from those in the scalp. The disorder may linger about the verge of the moustache or other parts of the beard, showing its grease and scales even at a distance from the line of hairs, with a well-defined, reddened surface beneath. The same occurs about the line of the eyebrows. Alopecia is uncommon in any of these regions except the eyebrows.

On the face the pityriasic forms, with a moderate degree of redness, are common on the nose and adjoining portions of the cheeks, the eyebrows and the regions between, and the eyelids and their margins, and may be exhibited on any part of the face. The more inflammatory moist and crusting types are most frequent along the junction of the alæ of the nose with the cheeks, but may involve the entire nose and other parts of the face. The macular and papular types above described are most common on the cheeks.

Seborrhea Corporis.—Upon the trunk is frequently found Unna's "flower-leaf" or "petaloid" type of the eruption, which was first

described by Duhring and to which have been assigned by different authors the titles *Seborrhea corporis*, *Seborrhea papulosa* or *lichenoides* (Crocker), *Lichen circumscriptus* (Willan), *Lichen annulatus et serpiginosus* (Wilson), and "flannel-rash."¹ Its favorite sites are the sternum and interscapular region, but rarely it spreads in more extensive areas on other parts of the trunk. In a well-marked case the lesions appear in the form of sharply outlined circles or segments of circles, which enlarge centrifugally, often coalescing to form patches with irregularly circinate outlines. The extreme borders, which represent the early stage of the lesions, are made up of very small, red papules, usually covered with fine, whitish or yellowish, dry or fatty scales. As the border progresses, the centre undergoes involution, so that from without inward the patch may display varying shades of red, brown, and yellow, while the whole surface is often the seat of a furfuraceous desquamation. Round or oval, somewhat elevated, solid lesions are frequent, and may scale slightly or be covered with yellow, greasy crusts. In less perfectly developed cases and in those modified by friction of the clothing or frequent bathing, there may be simply yellowish, finely scaling patches, with slightly reddened, more or less irregular borders.

The eruption also occurs upon the trunk and extremities in the form of macules, papules, and reddened patches, which by coalescence of individual lesions may become quite large. These lesions may present any degree of scaling or crusting, though there is usually a narrow, uncovered, reddened margin. The affected areas may be dry, and in form, distribution, and general appearance closely simulate psoriasis; or they may be somewhat moist and, as a result of irritation or of excessive exudation, may undergo a transformation to a condition indistinguishable from that of eczema. In most cases the yellowish color of the lesions is conspicuous, being most marked when the eruption is fading. While the dorsal surfaces of the hands and feet may be involved, it is very doubtful if seborrhoic dermatitis ever affects the palms and soles.

In the axilla and groin the eruption often begins as an erythema intertrigo, and owing to the influence of heat, moisture, and friction in these regions secreting patches are common. From these points the disease often spreads to the adjoining surfaces, the advancing margin of the eruption always being sharply outlined and usually of circinate contour.

A special seborrhoide of the face has been described by Pringle,¹ Fox² and Little³. It is an uncommon eruption, accompanied by flushing in the region, and characterized by large numbers of red, aggregated, miliary, indolent, perifollicular papules. They may acquire a deeper tint, and occasionally present minute atrophic spots. Under the diascop a citron-yellow base is seen.

¹ Brit. Jour. Derm., 1903, xv, p. 41 (A rare seborrhoide of the face).

² Quoted by Pringle, Brit. Jour. Derm., 1894, vi, p. 368.

³ Ibid., 1903, xv, p. 252.

PLATE XXXVI



Photo by Oram.

Dermatitis Seborrhoica. (Stopford Taylor.)

Etiology.—In his first description of eczema seborrhoicum, Unna claimed for it a parasitic origin. He has described three varieties of diplococci which he found in the lesions of this disease, beside several varieties of bacilli which were occasionally present. Of these he considered a mulberry-shaped coccus, which he called the *Morococcus*, of special importance, and on occasions has produced with it, by the inoculation of pure cultures, one or more vesicles, but without reproduction of a patch of true eczema seborrhoicum. He also found Malassez's flask-shaped bacillus in the scales.

Elliot¹ reports on a bacteriological study by W. H. Merrill of 50 cases of eczema seborrhoicum. In all but two cases (on which a solution of resorcin had been freely used) bacteria of some kind were found. Merrill describes two varieties of diplococci and a bacillus, all three of which were present in 31 cases, while one or two of them were found in most of the remaining cases. Twelve inoculation-experiments were made, of which seven were successful. From pure cultures of the cocci typical lesions of the disease were produced, from which in each case the special coccus was recovered and cultivated. One of these cocci was decided to be chromogenic and the cause of the yellowish color characteristic of the disease. Positive evidence of the transmission of the disease from one individual to another is difficult to get, though a history of probable contagion is obtained frequently.

Locally, heat, moisture, friction, and other forms of irritation may act as predisposing causes and favor the origin and spread of the disease. On the body it is often found in those who perspire freely and who wear wool next the skin. On the scalp it is common in those who keep the head covered much of the time. Elliot reports that the majority of his cases occurred in people who lived for the most part indoors, and that the affection is unusual among those who live largely in the open. His explanation of the greater prevalence of the disease in winter than in summer is that in the former season most people live indoors, with poorer ventilation, and bathe less than in summer.

The systemic conditions favoring the development of the disease are practically those named as predisposing causes of seborrhea.

Pathology.—Even in the mildest grades of the affection, corresponding to the condition known as pityriasis capitis, Elliot² found slight inflammatory infiltration about the papillary vessels and the ascending branches from the subpapillary plexus, and along the hair-follicles, while in the rete there were some vacuole-like formations in the basal layer, and a few wandering cells. In moderate grades the inflammatory infiltration extended to the subpapillary plexus, and in severe grades to the entire cutis, which was then somewhat edematous. In the rete, vacuoles were numerous and their origin could be traced to a nuclear degeneration. Many wandering cells were present, also karyokinetic figures and areas of cell-degeneration. The horny layer was thickened

¹ New York Med. Jour., 1895, lxii, p. 528. A subsequent report by Merrill, *ibid.*, 1897, lxx, p. 322, confirms these findings.

² Morrow's System, iii, p. 282.

and easily detached from the interfollicular spaces, but densely packed in the dilated openings and necks of the follicles. The sebaceous glands were apparently normal. The coil-glands in many instances were dilated and contained cast-off epithelial cells mixed with a granular débris, while mitosis and cell-degeneration were seen frequently. Elliot found no appearance that would warrant him in believing the coil-glands to be the source of the fatty hypersecretion. Unna, on the other hand, found fat in the coil-glands, and believes them to be the source of most of the fatty secretion characteristic of the disease. He also describes an infiltration of small, free globules of fat through all parts of the cutis and rete, inside the lymph-sacs. Elliot found no evidences of such infiltration; but Ledermann announces that he has recognized it in normal epithelium.

Unna and Elliot agree in considering all stages of the process an inflammation of a catarrhal nature, the immediate cause of which is to be found in one or more specific microorganisms. (See also *Seborrhea*.)

Diagnosis.—From other forms of dermatitis and from simple eczema, dermatitis seborrhoica may be distinguished by its origin on the scalp, its oily secretion and crusts, the yellowish color and sharp outline of its lesions, its tendency to spread peripherally in circinate outlines, and by its lack of marked subjective sensations.

In some forms of the disease the diagnosis from psoriasis is difficult, but the location of the lesions on the flexor rather than on the extensor surfaces, the oily character of the scales and crusts, the yellowish color, the greasy and scaly centre of circinate lesions undergoing involution, and the general course of the eruption, will usually suffice to distinguish the disease.

Pityriasis rosea may present appearances similar to those of dermatitis seborrhoica of the trunk and extremities. The lesions in the former disease, however, do not appear on the scalp, usually have ill-defined, frayed-out borders, and the enlarging rings present a dry, fawn-colored centre, which is free from greasy scales. The affection, moreover, runs an acute course, rarely lasting more than six or eight weeks.

Lupus erythematosus occurs chiefly upon the face; it is rarer upon the scalp and body. The scales of lupus are tenacious and dry, and require scraping for their removal; the contour of the lesions is well defined, and scars are produced as the condition resolves. Erythematous lupus is far less amenable to treatment, and persistency of lesions after a faithful trial of the remedies usually effective for seborrhoic dermatitis should always suggest a reconsideration of diagnosis. This fact holds especially true of lesions upon the scalp.

Trichophytosis corporis often appears upon the face, and might be mistaken for seborrhoic dermatitis; but the tendency to clear in the centre as the margin advances, the distinct elevation of the active edge, and the discovery of the fungus will establish the diagnosis. The same criteria hold for eczema marginatum, in which the fungus invades the crural region; in this, however, the fading of the central

portion is less pronounced than in ringworm elsewhere, and more dependence must be placed on the well-defined, elevated, advancing margin, and the demonstration of the organism.

Treatment.—Sulphur, resorcin, salicylic acid, white precipitate, and other preparations of mercury are remedies most useful in the treatment of all stages of the disease. For the earlier and dry forms, stronger and more stimulating preparations may be used, together with more frequent washings of the skin, than in the acute, moist forms, which must be treated more in accordance with the principles laid down for the treatment of the corresponding stages of eczema. For the scalp and other hairy portions of the body, lotions are usually better than ointments. The lotion recommended by Elliot, containing 3 to 20 per cent. of resorcin in equal parts of alcohol and water, is one of the best, and should be applied two or three times daily. For the dry forms of the disease a small amount of oil (preferably the oil of sweet almonds), to prevent the disagreeable drying effect of the lotion alone, may be added. Instead of thus combining the oil with the liquid, a thin ointment containing resorcin or sulphur may be substituted for or applied after the lotion. After soap-and-water washings, which should be used often enough to prevent accumulation of scales and crusts, an oily or fatty application is always desirable.

The most serviceable ointment in the majority of cases is one containing from 1 scruple to 2 drachms (1.33 to 8.) of sublimated or precipitated sulphur, 10 minims (0.66) of balsam of Peru, and 1 ounce (30.) of vaselin. Instead of sulphur, resorcin or ammoniated mercury may be used. In some chronic cases with much infiltration, sulphur, resorcin, and salicylic acid may with advantage be combined in the same ointment, while in a few instances the tars, pyrogallol, or chrysarobin may succeed after the above-named preparations have failed. In acute forms, in which the symptoms are more those of an acute eczema, pastes and ointments containing salicylic or boric acid are valuable until the acute inflammatory condition has subsided, when preparations containing sulphur or resorcin should be used.

The disease is usually more amenable to treatment than eczema, though recurrences are common.

ASTEATOSIS.

Synonyms.—Xerosis. Ger., Asteatose; Fr., Astéatose.

Definition.—Asteatosis is that condition of the skin in which there is absolute or relative deficiency of the sebaceous secretion.

Symptoms.—Insufficient lubrication of the skin by its natural unguent may be either general or partial, and occur as an idiopathic or a symptomatic disorder. It is produced artificially by any agents which continually withdraw the fatty substance from the skin-surface, as in those trades necessitating the constant immersion of any part of the body in strong alkaline solutions or in waters strongly impreg-

nated with calcium and potassium salts. As an idiopathic affection it is of rare occurrence, but it is not an infrequent accompaniment of other local or constitutional diseases, such as psoriasis, lepra, xeroderma pigmentosum, ichthyosis, and lichen ruber. In these cases the skin becomes dry, often thickened and indurated, and, as a consequence, friable, and prone to desquamation, fissures, and chaps. To the touch, the absence of sebaceous secretion is noticeable in the objective sensation produced. Asteatosis is a well-marked feature of the marasmus of old age. Some authors have described under this title the dry thickening and induration of the palm of the hand accompanied by curving of the fingers toward the plane of their flexor tendons, a condition that is occasionally to be observed in laundresses.

Treatment.—No internal medicaments are known to have the power especially of stimulating the sebaceous secretion. None, indeed, could be capable of having such action when, as is often the case in the disorders characterized by asteatosis, there has resulted an atrophy of the sebaceous glands. For external application cod-liver oil, almond oil, lanolin, palm oil, vaselin, lard, or butter may be employed. Vaseline is in many cases to be preferred, as the other articles named are liable to become rancid after oxidation, and thus act as irritants. Elliot prefers liquid albolene or benzol. With such partial or general lubrications, however, a warm bath of soap and water should be ordered every second or third day; immediately after the bath the inunction may be repeated.

Prognosis.—In all cases in which the asteatosis is induced by agents operating externally upon the surface, a reasonable hope of recovery may be entertained after withdrawal of the cause. Persistence of the latter is likely to be succeeded by the occurrence of eczema or dermatitis medicamentosa. A complete cure can scarcely be expected when this condition is a symptom of one of the disorders already named.

MILIUM.

Synonyms.—Grutum, Strophulus Albidus, Tuberculum Sebaceum, Acne Albida. Fr., Acné Miliaire.

Symptoms.—Milia occur upon and about the eyelids, the cheeks, the forehead, the temples; the penis, scrotum, and corona glandis of men; and the internal face of the labia minora of women. They are millet-seed- to pinhead-sized, pearly-white, occasionally symmetrically placed, globoid masses, rarely attaining the dimensions of a coffee-bean, and showing within the epidermis as though portions of kernels of rice were lying immediately beneath a translucent layer of tissue. They occasionally project from the surface to such an extent as to resemble small-sized vesicles having milky contents. In color they are yellowish and whitish. They are often congenital, and may be recognized about the lids and temples of the newborn infant; they are also seen in middle life, when they develop very slowly, and sometimes persist for years. They occasion no subjective sensation and

are commonly so insignificant as to constitute no deformity. They never degenerate by ulcerative processes, but in the course of years, when not artificially removed, are exfoliated in the natural processes of physiological desquamation. In rare instances the deposition within the milia of the salts of lime renders them as hard as cartilage (*cutaneous calculi*). These are usually of larger size and present a faint yellowish hue.

Etiology.—Milia may be of embryonic origin and occur in the newborn; they are common in infancy and early adult life, and are rare in middle life, though occasionally they develop after the thirtieth year. They are at times produced mechanically; as when the stroke of a knife-blade, accidentally or in the processes of surgery, separates one or more of the acini of a sebaceous gland from the main body. The contracting bands of a cicatrix, after destruction of tissue from any cause, may operate in a similar way with precisely the same result; and they may thus follow the lesions of tuberculosis, syphilis, erysipelas, pemphigus, and epidermolysis bullosa.

Pathology.—When a milium is incised externally, a spherical body of nearly corresponding size may be expressed, though it may require tearing from a minute pedicle below, which represents the attachment to the hair-follicle. The small mass thus extracted is seen to be a horny cyst composed of several thin envelopes, suggesting the capsules of the onion, and representing cornified epithelia which have not undergone fatty metamorphosis. In the centre of the cyst is a fatty nucleus. There is never any lobular formation. Each of these horny cysts is developed in connection with the lanugo hair-follicles, distending the latter, as Unna has shown, irregularly and on one side. Virchow and Rindfleisch believe the process represents a hyperkeratosis of the epithelium of the hair-follicles, though it is believed by others that the milium represents a retention-product of the sebaceous glands. Robinson believes that milia originate from miscarried embryonic epithelia from hair-follicles or from the mucous layer of the epidermis.

Diagnosis.—Milia might be mistaken for minute vesicles containing a milky fluid, but puncture of a lesion, with expulsion of its contents, at once discloses its character. Comedones with blackish external points, surrounded by the patulous orifice of the excretory duct and prolonged more deeply into the substance of the skin, could scarcely be confounded with milia. The most minute of the lesions of xanthoma have a yellowish color, and cannot so readily be scraped away from the subjacent tissue as can milia.

Treatment.—Milia rarely require treatment, as they are usually relatively few in number, and produce neither subjective sensation nor deformity. If desired, they may be opened with a fine milium-needle and their contents turned out, or they may be scraped off with a curette. To insure their non-recurrence, the little sac left after the operation may be entered with a needle which has been dipped in a 50 per cent. solution of chromic acid. This operation may have to be repeated in the rare cases in which the lesions exhibit a tendency to recur.

The convenient method of removing these and many similar-sized lesions of the skin is by electrolysis. With from four to six cells in the circuit, the negative pole is connected with a fine needle, which is introduced within and beneath the lesion, while the moistened sponge of the positive pole is in contact with the skin of the patient. This operation is bloodless and effectual, insignificant scars resulting.

Occasionally, milia upon the scrotum give rise to sexual hypochondriasis, which may demand attention; suggestive, rather than active, operative treatment is needed in these cases.

Prognosis.—The prognosis is always favorable.

Milium Congenitalé (*en plaques*) has been described by Crocker,¹ Hans Hebra, Wilson, and Colcott Fox as a congenital condition in which occurs a reddish-yellow patch (destitute of hair when existing on the scalp), with well-defined border and a granular surface, constituted of minute yellowish papules, with comedones at the periphery and elsewhere.

STEATOMA.

Synonyms.—Wen, Atheroma, Pseudo-atheroma, Sebaceous Cysts, Sebaceous Tumor. Fr., Stéatome, Kyste Sébacé; Ger., Balgeschwulst, Grützbeutel.

Definition.—This disease is characterized by the occurrence of one or several roundish, globular, elevated, soft or firm tumors, situated in or beneath the skin, and unaccompanied by subjective symptoms.

Symptoms.—Sebaceous cysts are usually of slow growth, and unattended by subjective sensations. They occur as single or multiple, elevated, occasionally flattened, fixed or movable tumors on the head, the trunk, or the genitals; and vary in size from that of a pea to a hen's egg, or larger. They are situated beneath, within, or upon the skin; usually are unattached to the deeper contiguous tissues; and develop into irregularly globular, occasionally large, button-shaped masses, covered by an integument usually unprovided with hairs. The skin covering them may be normal in hue, or unnaturally whitish from pressure; or, especially upon the bald scalp of certain fleshy men of middle years, reddened, shining, and greasy in appearance. In a certain proportion the duct remains patulous and is closed with a black, horny plug, suggesting a giant comedone. In these the semisolid, cheesy, and milky contents often emit a nauseous odor. Occasionally, a cutaneous horn develops in connection with this type. These tumors vary in size from time to time, according to the amount of escape of the contents. At times the cysts are to be distinguished only by passing the fingers through the long hairs of the scalp beneath which they are hidden; at other times they are so conspicuous, in consequence of physiological alopecia, as to occasion considerable disfigurement. They vary greatly in consistency, but usually produce to the touch a certain feeling of elasticity, especially if the cyst be

¹ Diseases of the Skin, 3d ed., p. 1131.

distended tensely. They may persist for years without producing inconvenience, save that resulting from their bulk and the consequent disfigurement; but may be attacked by inflammation, which may result in suppuration and ulceration. In rare instances in elderly people epitheliomatous degeneration may supervene in an infected sebaceous cyst.

Usually but one tumor is present, though two or more are occasionally seen.¹ As a rule, the multiple cysts are dermoid in character. These occur generally distributed, and resemble multiple fibromata or xanthoma. Such cases are recorded by Pollitzer,² Jamieson,³ Maclaren,⁴ and Chiari.⁵

Chalazion is a term employed to describe pinhead- to small-nut-sized cystic tumors occurring on the eyelids in connection with the Meibomian follicles, and there may be one or several. They are of slow growth, and present no symptoms other than enlargement, unless secondarily infected. By some authorities they are considered neoplasms.

Etiology and Pathology.—The cause of sebaceous cysts is not definitely known. By some they are thought to be produced in the same manner as the comedo-plug. Virchow considered them retention cysts. Török,⁶ after a careful study of 26 cases, found papillæ in most of them, and concluded that the major portion of sebaceous cysts were dermoids, which confirmed the previous findings of Franke. This would place their genesis in embryonic remnants in the skin. Török also stated that such cysts contained no fat.

Dubreuilh and Tribondeau⁷ found in certain cases budding occurring from primary cysts, which produced secondary cysts, and at times produced multilocular tumors. These they termed "proliferating wens."

Ehrman and Fick⁸ suggest that the pathogenesis may be explained by anomalies in the life-history of the cells of the sebaceous glands, whereby they undergo horny rather than fatty metamorphosis, thus leading to retention and cyst-formation.

Histologically, the capsule is composed of fibrous tissue, which may be thin, or hard and dense, poorly supplied with connective-tissue nuclei and blood-vessels, and lined with epithelium. The contents vary in consistency and character, and may be semisolid, curdy, cheesy, and granular, or fluid, honey-like, or milky, and consist of epithelial cells undergoing fatty degeneration, fat, cholesterolin crystals, and occasionally lanugo hairs.

Diagnosis.—Steatomata are to be distinguished from fatty tumors, the latter, however, are observed more commonly about the scapulæ,

¹ Kingsbury, Jour. Cut. Dis., 1913, xxxi, p. 784.

² Jour. Cut. Dis., 1891, ix, p. 281 (Lesions resembling xanthoma).

³ Edin. Med. Jour., September, 1873, p. 223.

⁴ Brit. Med. Jour., October, 1886 (Lesions resembling fibromata).

⁵ Zeitschr. f. Heilkunde, 1891, xii, p. 189.

⁶ Monatshefte, 1891, Bd. xii, Nos. 10 and 11; abstr. Brit. Jour. Derm., 1891, iii, p. 365.

⁷ Annales, 1910, i, Nos. 8 and 9, p. 417; abstr. Jour. Cut. Dis., 1911, xxix, p. 185.

⁸ Kompendium der Speziellen Histopathologie der Haut, Wien, 1906.

loins, buttocks, and extremities; whereas wens are very rarely found except about the scalp and neck. They lack also the peculiar "pillowy" feel of fatty tumors. Suppurating wens in the regions named may readily be mistaken for circumscribed abscesses, the result of other causes. The history of the characteristic tumor long preceding the abscess makes the distinction. Syphilitic nodes and gummata of the same parts are usually both tender and painful. Osteomata are solid growths and immovable.

Treatment.—The removal of a wen is accomplished by excision, care being taken to remove the sac *in toto*. With aseptic precautions, ablation of these lesions from any part of the body may be regarded as unattended with great risk. As the incision required for removal of the wen necessarily must extend some distance on either side of the tumor, there results a linear scar, which on the bald scalp is often a very conspicuous relic of the lesion. In consequence of the possibility of danger, many surgeons prefer destruction of a prominent section of the mass with acid or alkali, leaving the sac, after expulsion of its contents, to wither gradually, though it may then often be withdrawn with forceps.

Complete obliteration is sometimes effected by puncture, expression of the contents, and subsequent induction of artificial inflammation in the walls of the cyst by injection of tincture of iodine, ether, or other irritating fluid, as in the operation for relief of hydrocele.

Prognosis.—As a rule, a sebaceous cyst causes nothing more than disfigurement and slight inconvenience. The removal of the wall of the cyst is not followed by a return of the lesion. In debilitated and cachectic patients there may be spontaneous ulceration and sloughing, with or without surgical interference. Bryant¹ reported a carcinoma following the removal of a steatoma from the buttock of a woman sixty-three years of age. The rare occurrence of malignant change arising in elderly people is to be remembered.

COMEDO.

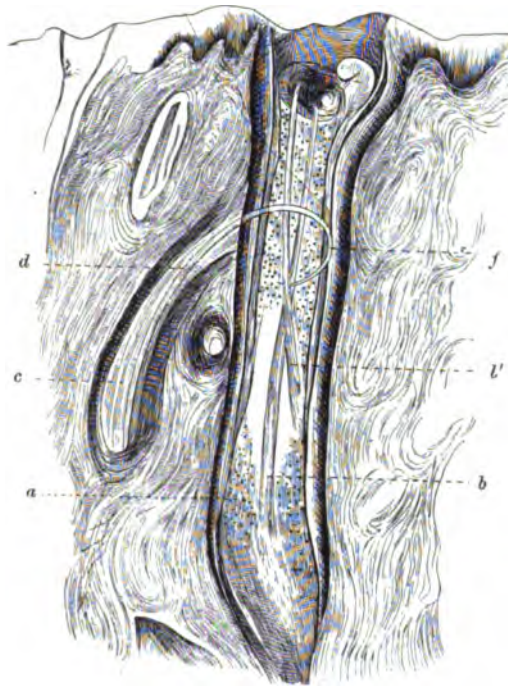
Synonyms.—Black-head. Ger., Mitesser; Fr., Acné Ponctué, Acné Comédon.

Symptoms.—Comedones are grayish, blackish, yellowish, or otherwise colored, dots or points, resembling grains of powder, sprinkled over the surface of the skin, each point representing the external extremity of a plug of inspissated secretion lodged in the excretory duct of a sebaceous gland. Occasionally, they project to an appreciable distance above the general level of the integument, but often the extremity of each plug is slightly depressed below that level. There may be but two or three comedones upon the face, which is their commonest seat; or the nose, forehead, cheeks, and chin, the front and back of the neck, the concha of the ear, the back of the

¹ Brit. Med. Jour., 1884, i, p. 1044.

trunk, and the penis may be thickly studded with them. They may also be found upon the hairy scalp. The visible extremity of the comedo varies in size from that of a needle-point to that of a pinhead. Comedones are readily expressed from the follicles in which they are lodged, and when thus examined they are seen to be whitish moulds of inspissated sebum, one or two lines in length, the exposed extremity of each comedone having become discolored by diffused pigment deposited within. In consequence of this suggestive appearance of the lesion, the disease has been called "black-heads" and

FIG. 273

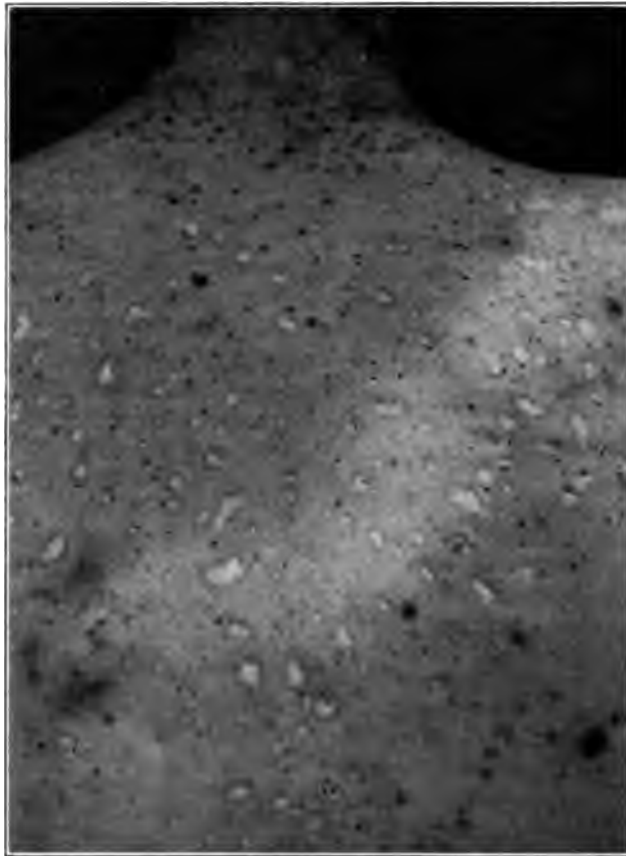


Section of a comedo: *a*, excretory duct of a sebaceous gland filled with a comedo; it contains also two small hairs with brush-like inferior extremities; into it opens a small hair-follicle (*c*); the contained hair (*d*), after touching the opposite wall of the duct, curves downward, at *f*. (After Kaposi.)

"skin-worms." The deformity produced in the face when these lesions exist there in large numbers is strikingly conspicuous, and it is for the relief of this appearance chiefly that the practitioner is consulted. The subjective symptoms awakened are of trifling moment. The disorder is essentially chronic in its course. Isolated comedones may be observed for years in one situation without apparent change or modification of any sort, and without producing the slightest local or constitutional derangement. Others appear, and later disappear under the influence of the usual hygienic regimen of the skin of the face.

Others, again, serve to irritate the skin in which they are implanted precisely as though they were foreign bodies; and the sebaceous glands and periglandular tissues, with and without the operation of such cause, exhibit grades of hyperemia and inflammation, the lesions then becoming those of acne. Comedones may, even to the extent of great multiplicity, occur as the sole lesions of the skin; more frequently, they coexist with other diseases of the sebaceous glands, chiefly acne and oily seborrhea.

FIG. 274



Double comedo.

Occasionally, a so-called *double comedo* is found. These have a common base below with two points of exit. When expressed from the skin the plug of inspissated sebum in this variety is seen to have both extremities discolored. *Grouped comedones*, first described by Thin¹ are commonly found in symmetrical disposition on the forehead and cheeks. They are smaller than the ordinary variety, are not asso-

¹ Lancet, 1888, ii, p. 712.

ciated with acne, and show no tendency to inflammation or suppuration. According to Crocker, they occur chiefly on the flush area of the face, and are commonly associated with gastric disturbance. Grouped comedones in children were first recorded by Crocker.¹ In these the lesions occur chiefly on the cheeks in infants, and on the temples, forehead, and occiput in older children. The lesions are densely packed, firmer than the ordinary variety, and, according to Crocker, appear to be excited by local irritation, warmth, or moisture. Cases occur in which the lesions are seen in addition on the chest or other parts of the trunk.² *Scar-comedones*, single, double, and grouped, have been recognized in the form of atrophy of the follicular orifices (Lang, Selhorst, Thibierge). Large and numerous lesions of this type have been reported after kerion (Crocker) and variola (de Coquet).

Etiology.—Comedones may occur at any period of life, but, like seborrhea, are most frequently observed at puberty in both sexes, when the pilo-sebaceous structures take on a greatly increased activity. They may occur in children, with a special tendency to grouping in places subjected to heat and moisture. Recently, we have recognized them in typical development and considerable numbers on the face of a nursing infant. Crocker was first to notice the fact of their occurrence in young subjects.

Much has been written with reference to neglect of the skin as a cause of comedo, the non-employment of soap in washing the face, and the influence of the trades, as in the case of those who work in metals, dust, and tar; but observation shows that these are rather exceptional causes. On the one hand, very obstinate and generalized lesions occur in the skins of intelligent young men and women of the upper social classes, who regularly wash their faces with toilet-soap, who are rarely exposed to dust, and whose habits and recreations are of the most healthful character. On the other hand, observing the grimy faces of coal-heavers, machinists, masons, and ink-manufacturers, one is impressed with the rarity of the disease in such laborers. This disorder is somewhat more frequent in thick-skinned brunettes, or in men with a characteristic reddish-brown and greasy-looking complexion, than in individuals having a fair and delicate skin.

In many patients there is an unmistakable connection between this disorder and chlorosis, dyspepsia, habitual constipation, menstrual derangements, and cachexia. This connection is demonstrated by the remarkable improvement manifested in the untreated skin when restoration of the general health has occurred.

The microbacillus of Unna and Sabouraud found in the comedo-plug is accepted by the major portion of investigators as the direct cause of the disorder. (See Acne.) *Acarus folliculorum* (see paragraphs under this title) is also found in the comedo, but plays no part in the etiology of the disorder. The grouped comedones are believed

¹ Lancet, April 19, 1884.

² Little, Brit. Jour. Derm., 1903, xv, p. 253; MacLeod, *ibid.*, p. 453.

to be due to some form of local infection, the exact nature of which is not determined.

Grouped comedones occurring in infants and children are due to local irritation. In one case,¹ they followed the local application of camphorated oil. The common use of a family shawl has been suggested as causative by Harries.²

Pathology.—Comedo is a dense collection of concentrically arranged epithelial cells, in the centre of which are dried sebum, fragments of epithelia that have undergone partial fatty transformation, and minute lanugo hairs. It is located either in the excretory duct of the sebaceous gland, or in the pouch-shaped canal common to the sebaceous gland and the hair-follicle. The first step in its formation is hyperkeratosis of the duct, produced by some external irritation. In the regions in which comedones are found the sebaceous glands are much larger than the hair-follicles to which they are attached. In consequence, as demonstrated by Biesiadecki, the hair-follicles often form obtuse or even right angles with the duct of the gland, causing the point of the hair to project against and irritate the wall of the duct. Unna, Sabouraud, and others believe the external irritation is furnished by a definite microorganism, Sabouraud claiming that comedo is always preceded by oily seborrhea. The blackness of the head of a comedo may be due in part to accumulation of dust or dirt, but is owing chiefly to a definite pigment which extends for some distance below the exterior face of the plug. This pigment is soluble in concentrated nitric or hydrochloric acid, and in hydrogen peroxid. The double comedo is believed to arise from the merging of two glands in close proximity by pressure atrophy of the tissues which normally separate them, thus forming one cavity with two ducts.

Diagnosis.—The recognition of the disorder is attended with no difficulty, patients themselves being usually sufficiently observant to identify the affection, though frequently misled as to the character of the "skin-worm." It is, as might be expected, a frequent coincident of acne; its lesions when commingled with those of the disease last named being either in preponderance or so infrequent as scarcely to attract the attention of the patient. A condition somewhat resembling comedo may be produced upon the face when tar or ointments of mercury and sulphur are applied to it at the same time, the resulting black sulphid, appearing conspicuously at various points upon the skin, often at the orifices of the sebaceous glands.

Treatment.—The internal treatment of patients affected with comedo is that described in connection with the subject of acne. Cod-liver oil, iron, the bitter tonics, and the medicaments indicated by any special condition of the patient's health are not to be omitted. Open-air exercise, daily cool salt-and-water bathing, as in the management of acne, and the avoidance of all medicinal and dietary articles which may tend to aggravate the disorder, are also imperative. Many

¹ Dore, *Brit. Jour. Derm.*, 1909, **xxi**, p. 220.

² *Brit. Jour. Derm.*, 1911, **xxiii**, p. 5.

of these patients require at the outset alterative cathartics, among which may be named the pill of blue mass (taken for several consecutive evenings, and followed by the effervescing sodium phosphate in the morning), calomel, cascara sagrada, and castor oil.

Even aggravated cases of comedo are completely relieved in the course of time without treatment. The relief, however, may require years for completion. The rarity of comedones in middle life and advanced years sufficiently attests this fact. Presumably, this natural cure is due to the removal of irritation within the duct in consequence of a more vigorous growth of lanugo-hairs with the advance in age. The rarity of comedones in the scalp, where the hair is vigorous, is certainly a significant fact.

Comedones are removed artificially with the aid of an extractor. The instrument formerly employed for this purpose was shaped like a watch-key, the cylinder having a smooth bore and bevelled extremity. This clumsy tool is far surpassed by the exceedingly convenient comedo-extractor designed by Unna and modified by Piffard. Each end has a convex, bowl-like surface, with apertures cut to gauge and slightly countersunk. The extractor, or "presser," is productive of far less pain to the patient than other instruments, and can be wielded, on account of its long shank, with greater precision and ease by the physician. The surface to be operated upon is previously moistened by spraying it with a solution of formaldehyd (0.5 per cent.), of thymol and glycerin, or of eucalyptol and glycerin. Often a sharp-edged or well-rounded needle, firmly held in a needle-holder, may be advantageously employed, alternately with the extractor, in opening certain follicles or loosening the plugs of others. An ointment containing resorcin applied for two or more evenings preceding the use of the comedo-extractor facilitates the removal of the comedones.

Once the comedones are removed, the skin should be sponged and bathed with hot water, then thoroughly dried and anointed with an ointment, which may be medicated to suit the indications of each case. Sulphur, as in many disorders of the sebaceous glands, enjoys here a high reputation. In the strength of from 10 grains (0.66) to 1 drachm (4.) to the ounce (30.) of cold cream or vaselin, it may be applied as an ointment; or as a lotion, in combination with alcohol or glycerin. A useful application is suggested by Piffard: equal parts of sublimed sulphur, alcohol, compound tincture of lavender, glycerin, and camphor-water.

Mercurials are also of some advantage locally, but should not be employed at the same time as the preparations of sulphur. The use at night, especially in obstinate cases, of the ammoniated mercury ointment, or of one compounded of 2 grains (0.133) of the red oxid to the ounce (30.) of cold-cream salve, will often prove of benefit. In the case of coarser skins, mercuric chlorid, 1 to 2 grains (0.066–0.133) to the ounce (30.) of glycerin and rose-water, may be substituted for the red-oxid ointment.

When extraction of the plug is not attempted mechanically, something may yet be done to remove the inspissated mass. Repeated sponging every third night with 1 ounce (30.) of green soap, dissolved in an equal quantity of cologne-water, will at first seem to render the comedo more conspicuous, but will slowly operate to soften and remove the sebaceous secretion.

An ointment recommended by Van Harlingen (*Handbook of Skin Diseases*), containing 4 parts of kaolin, 3 of glycerin, and 2 of acetic acid, with or without the addition of a small quantity of ethereal oil, may be applied at night for a few days in succession, the eyes being carefully protected; at the end of this time the black points of the lesions are removed and the comedones readily extracted. Citric or dilute hydrochloric acid is employed with the same end in view. These topical remedies cannot be considered as efficient in every form of comedo.

Comedones of the penis need not be treated. The statement is suggested by the occasional demand made upon the physician by the sexual hypochondriac, who regards these lesions with singular alarm.

Prognosis.—As the disease naturally tends to spontaneous, though occasionally long-deferred, resolution, the prognosis is favorable. Treatment in most cases will accomplish much in hastening the disappearance of the comedones. The most obstinate forms are those in which the face, the inside and back of the ears, the neck, and the shoulders are studded with relatively small, indolent comedopoints, about which the circular lip of the duct rises in a whitish rim. Such cases, however, are nearly allied to the forms of acne described elsewhere. With exceeding rarity, the comedo is merely the introduction to a more serious local affection. In early life a single prominent lesion is commonly formed, and though the plug be frequently removed, and finally be no longer reproduced, the orifice of the duct remains patulous until middle life. Slowly thereafter, its walls undergo a metamorphosis and a warty epithelioma may result.

ACNE.

Synonyms.—Acne Vulgaris, Varus. Fr. Acné; Ger., Hautfinne, Akne.

Definition.—Acne is a chronic, inflammatory disease of the sebaceous glands and periglandular tissues, exhibited chiefly over the face, neck, shoulders, and anterior and posterior surfaces of the upper thorax in the form of an eruption of papules, pustules, and smaller and larger nodules, usually intermingled with comedones, and often associated with seborrhea of the scalp. It rarely develops before puberty, and is unusual after the third decade of life.

Symptoms.—The disease is characterized in general by the occurrence of several (but usually numerous) light-red, dull-crimson, or violaceous, pinhead- to small-nut-sized, ill-defined papules, pustules, nodules, tubercles, or non-projecting indurations of the skin, often commingled with the symptoms of comedo and seborrhea. The lesions

are isolated or irregularly scattered over the surface, which, however thickly studded with them, never displays a grouping or definite arrangement of the elements of the eruption. Many of the lesions are both slightly painful and tender, though upon this point there is a wide range of difference in various individuals. As a rule, itching sensations are absent. The inflammatory process, which manifestly involves the sebaceous glands and periglandular tissues, may result in suppuration of several adjacent follicles, as a consequence of which coalescence occurs, and pea- to large-nut-sized cutaneous and sub-

FIG. 275



Acne vulgaris. (From G. H. Fox's Atlas of Skin Diseases.)

cutaneous abscesses may form. In many cases, however, the suppuration is limited to the area of individual nodules. Every feature of the disease, from the smallest papule to the largest subcutaneous abscess, may be displayed at the same moment in an affected individual. Under circumstances of special aggravation, the disease may occur in acute forms, but it is commonly chronic, the acute phases being usually accidents of the general process. When resolution occurs, the points of location of former papules and nodules are frequently marked by reddish-brown pigment spots, which gradually fade with time.

In aggravated cases, in which suppuration has been extensive, small pitted scars are left after the disappearance of the disease.

The lesions of acne are found most commonly upon the face, but they are seen frequently upon the neck, the shoulders, the back, and front of the upper chest, the genitals, and the extremities, and occasionally on other parts of the body, the palms and soles being excepted. The disease is intermittent in severity, the patient being at times relatively free from symptoms and at others conspicuously disfigured. It is

FIG. 276



Scars following acne vulgaris (untreated).

frequently associated with mild or severe alopecia pityroides and pityriasis steatoides, the totality of symptoms depending upon similar causes in the susceptible subject.

In acne certain clinical forms are recognized; these are conveniently designated by various terms, which refer chiefly to external features.

Acne Punctata.—In this variety the apex of the developing papule exhibits the characteristic blackish punctum of the comedo about which the papule is forming.

Acne Papulosa.—In acne papulosa the lesions are of papular type, ranging in size from that of a millet-seed to that of a coffee-bean whitish or reddish in color, and varying in the amount of induration at the base. They are often commingled with pustules, papulopustules, and comedones. At the apex of each papule may frequently be distinguished the blackish point characteristic of acne punctata, or a minute, greasy, yellowish-white spot, which represents the non-pigmented extremity of an inspissated sebaceous plug.

Acne Indurata.—This type of the disease takes its name from the dominant clinical feature and is characterized by the preponderance of deeply seated, firmly indurated lesions. Lesions of this type occur frequently on the shoulders, back, and chest. These have their beginning in the lower portion of the corium and in the subcutaneous tissue, develop toward the surface, and eventually appear as conical or rounded projections, of variable size and elevation above the normal skin. Their color ranges from a light-red in the smaller to a dark-red or violaceous hue in the larger lesions. In severe cases tenderness and pain are marked, and the presence of the livid swellings scattered over the face produces considerable deformity of feature. In the larger nodules suppuration occurs, manifested by fluctuation over the central portion, the base remaining indurated. Owing to the thickness of the roof-wall, the pus is seldom spontaneously evacuated. During resolution, which occurs by slow absorption, a collarette of scales is usually present about the lesion.

Acne Pustulosa.—This is the most frequently observed of the expressions of the disease. The lesions are apt to be commingled with papules and comedones. The pustules almost invariably originate in previously formed papules and may be large or small, containing merely a droplet of pure pus, or, when abscess-formation ensues, a teaspoonful or more of pus may be mingled with blood and serum. This accumulation may be evacuated surgically or accidentally, or be absorbed, or may remain for a long period of time in a species of cyst, whence it can finally be removed. In aggravated cases, two or more of these pustulo-furuncular dépôts may coalesce, forming nut-sized abscesses; or, not rarely, may become united by fistulous tracts, through which there is free communication of the fluid contents of two or more chambers.

FIG. 277



Acne vulgaris.

Under the title *Acne aggregata seu conglobata*, Reitmann¹ describes a group of cases which he says are not uncommon in Riehl's clinic, occurring in men considerably after puberty, and characterized by very large comedones and comedo scars; the nearly universal presence of small comedones in almost every follicle of the entire trunk as far as the scalp; a follicular and perifollicular inflammatory infiltration, largely confluent; when softened, open in several places; their laxity and brownish color suggesting tuberculous processes; the termination in characteristic depressed scars; and also the frequent presence of double comedones.

Hartzell² described a case having on the shoulders, back, buttocks, thighs, the chest, the neck and the face hundreds of sebaceous cysts and comedones and acne papulo-pustules. The reddened cysts were hazel-nut to English walnut-size and resembled fibromata in appearance. Some had reddened surfaces. On the neck were band-like, keloidal lesions and inflammatory scars suggesting broken-down tuberculous glands.

In a certain proportion of cases keloidal growths³ occur as a sequel to the suppurative lesions. The keloidal growths occur irrespective of operative procedure. These lesions are usually found about the neck, over the back, and occasionally on the face. Marked disfigurement and deformity may be present.

While, as a rule, the lesions of acne are situated as above noted, on the face, neck, shoulders, chest, and back, occasionally a peculiar situation is selected. In the case of a hemp-worker recorded by the author typical lesions were present abundantly on the abdomen, thighs, and forearms.⁴

Acne Vulgaris.—Acne vulgaris is a term applied to the composite eruption which is common to the majority of clinical cases. Here the various lesions described above (papules, pustules, comedones) are associated, usually on the face and over the shoulders, each in several degrees of development, often in conjunction with the scars left by a prior eruption. *Acne disseminata* is another name given by some authors to this common composite type of the disease.

Acne Artificialis.—Various substances, either applied topically to the skin or ingested, are capable of producing acneiform lesions. Among them may be named tar, which may prove an irritant whether employed externally or internally, and, far more frequently, the salts of iodine and bromine after ingestion. Tar-acne occurs both among workers in tar and in those subjected to the action of this substance for the relief of other cutaneous disease. Pinhead- to pea-sized, reddish-brown papules then form, at the apex of each of which is perceptible a minute blackish punctum, produced by the lodgment of a particle

¹ Archiv, xc, p. 249, abstr. Jour. Cut. Dis., 1909, xxvii, p. 138.

² Jour. Cut. Dis., 1909, xxvii, p. 262.

³ Morris and Dore, Brit. Jour. Derm., 1909, xxi, p. 329. Williams, Jour. Cut. Dis., 1909, xxvii, p. 462. Little, Brit. Jour. Derm., 1910, xxii, p. 266.

⁴ Jour. Cut. Dis., 1906, xxiv, p. 82.

of the medicament in the orifice of a sebaceous follicle. Pustular and furuncular lesions are, however, also produced, such as occur in bromid and iodid acne. In the latter disease the presence of the drug has been demonstrated in the contents of the pustular lesions. Chrysarobin and a number of other medicinal substances are capable of exerting a like effect.

Acne Atrophica and Acne Hypertrophica are terms employed to designate merely the lesion-relics of the disease. In acne atrophica there is complete atrophy of the gland tissue, indicated by a minute sunken pit in the site of the former orifice. In acne hypertrophica there are, in consequence of the periglandular exudation, a thickening of the tissues about the acini, and a projection from the surface in the form of persistent, pea-sized, indurated masses.

Acne Cachecticorum or Scrofulosorum includes the symptoms encountered in the subjects of struma, scorbutus, marasmus, chloro-anemia, and tuberculosis. The lesions are developed more often on the trunk and the extremities than over the face, and are indolent papulopustules, pinhead- to bean-sized, remarkable for their livid, purplish, lurid red, or violaceous tint. The lesions rarely are indurated; more often they are soft, pus- and blood-containing nodules, sluggish in career, leaving minute cicatrices. Their features are due to the general cachectic condition of the subjects in whom they occur. Colcott Fox describes acne scrofulosorum as it occurs in infants (*Cf.* Chapter on Tuberculids).

Acne Keratosa.—Under this title Crocker¹ reports four cases in women, in whom there appeared on the face, chiefly about the angles of the mouth, but also in other situations, firm, painful, inflammatory papules, succeeded by pustules and crusts. From the centre of these lesions could be expressed short, soft, or horny plugs, which were evidently formed in the sebaceous glands or hair-follicles. On removing the plugs, the lesions healed slowly, in many instances leaving a scar. In a case of this type under observation, the presence of the sebaceous plug was a source of great irritation, and there occurred an irresistible desire to work with the lesion until the plug could be removed, after which all irritation subsided. In all cases the disease is persistent. In one of Crocker's cases it lasted for forty years. Treatment, even including radiotherapy, appears to be only temporarily beneficial.

Acne Urticata.—Acne urticata is described by Kaposi, Touton, Löwenbach,² and others, as occurring on the scalp, face, and other portions of the body. The primary lesion, which is preceded by itching and burning, is a small wheal which enlarges to the size of from 6 to 12 mm., when the centre becomes paler and depressed and shows a vesicle, which dries into a crust. The crust falls, leaving a small scar, which in time becomes depressed and shining white. The full development of a wheal requires from four to six days.

¹ Brit. Jour. Derm., 1899, xi, p. 1.

² Archiv, 1899, xlix, p. 29.

Adamson¹ suggests that there are two types of this disorder: one occurring in hysterical girls, produced by rubbing with the tip of the finger; the second occurring in older patients, who are also nervous but not hysterical, and who admit rubbing the skin on account of the presence of a small itching spot or papule.

Etiology.—Acne is probably the cutaneous disease of most common occurrence. Its causes are numerous and in many cases obscure. They are both systemic and local, for even the most ardent advocates of the parasitic origin of the disease must admit that predisposition, based on constitutional conditions, is an important factor. The disease occurs usually in the second, and in most instances disappears during the third, decade of life, although it occasionally persists, or even begins later. Among the predisposing causes the changes incident to the age of puberty in both sexes are important. The great physiological activity manifest in the hair-follicles and sebaceous glands at this period of life is easily perverted to the pathologic by such frequently operative factors among young people as illness, malnutrition, overwork, or improper conditions of life.

The disease very often is related to disturbances of the gastrointestinal tract,² especially constipation, hepatic torpor, and fermentative dyspepsia. The eating of indigestible food, over-indulgence in alcohol, coffee, or tobacco, as well as over-eating, frequently cause an outbreak of lesions in the predisposed individual. In the matter of diet individual peculiarities are evident; articles of food which are perfectly well borne by one may provoke an attack of acne in another. Certain drugs, more commonly the bromids and iodids, aggravate an existing acne. In women the disorder is frequently worse just before or during the menstrual period. At times reflex nervous influences seem to stand in causal relation to the disease. Disturbance of metabolism found in goitre is cited as causative by Montgomery and Culver,³ and Chalmers.⁴ It must be said, however, that in many individuals suffering from acne no defect in the general health can be discovered.

In some cases the disorder is limited for long periods of time to a few follicles or to a small area, and is undoubtedly local in origin. Among the local conditions favoring the development of acne may be mentioned: oiliness of the skin due to hyperactivity of the sebaceous glands; mechanical plugging of the sebaceous follicles, as with dust and dirt; failure to remove with soap and water accumulations at the mouths of the follicles; irritation of the follicles by too frequent use of strong soaps or by the application of cosmetics. Lesions may be induced in unusual regions, such as the abdomen and limbs, by irritating oils used in the trades.⁵

¹ Brit. Jour. Derm., 1912, xxiv, p. 415.

² Kapp, Therapeut. Monats., March, 1907.

³ Jour. Cut. Dis., 1912, xxx, p. 189.

⁴ University of Toronto Med. Bull., December, 1912, i, No. 2, p. 47; abstr. Jour. Cut. Dis., 1913, xxxi, p. 694.

⁵ Ormsby, Jour. Cut. Dis., 1906, xxiv, p. 82; and Pusey, *ibid.*, 1908, xxvi, p. 426.

PLATE XXXVI.



Acne-keloid of the Back.

Bacteria.¹—The part played by bacteria in the cause of acne and also comedo is a matter which has caused much discussion. Practically uniformly a microbacillus is present in the comedone. A similar organism is usually present in all acne lesions. In addition to this organism, the *Staphylococcus pyogenes albus* and *aureus*, and a staphylococcus which cannot be recognized as identical with these, are also described. Unna, in 1893, first described a microbacillus which he termed acne bacillus. These bacilli occur as small rods, $1\frac{1}{4}$ to $1\frac{1}{2}$ microns in length and $\frac{1}{4}$ to $\frac{1}{2}$ micron in width. They often have an end-to-end arrangement, like tubercle bacilli. In 1897, Sabouraud² described a similar organism. To this organism Sabouraud attributed the oily seborrhea as well as the comedone. He usually found a white coccus in association with the bacillus, to which organism he attributed the suppuration. In 1899, Gilchrist isolated a special bacillus in smears from 96 pustules from 56 patients, which he named *Bacillus acnes*. This bacillus is described by him as being short and thick in smears; longer, thicker, and branched in cultures. Inoculation experiments were successful, and in addition agglutination tests in the dilution of from 1 to 10 to 1 to 100 gave a positive reaction. Agglutination tests carried out by others have shown both positive and negative results. Whitfield³ concludes that the microbacillus is concerned in the production of the comedo, but not in the subsequent acne-pustule. The rôle played by the microbacillus of Unna and Sabouraud is undecided, and the question as to whether the organism described by the various investigators is identical is also undecided. Various minor differences as to its growth have caused much confusion. It has been grown by some anaërobically, and apparently aërobically by others. Again, it has been found abundantly in patients exhibiting no symptoms. Schamberg⁴ found a bacillus, which was apparently identical with that of Unna and Sabouraud, in the sebaceous follicles of 90 per cent. of individuals. Haase⁵ believes the organism to be similar, but observed in different phases. In 1908, Unna⁶ gave to the coccus which always gives a milk-white color an important place in the etiology of acne. This observation was confirmed by Schwenter-Trachsler,⁷ who reproduced comedones with the organism. A diplococcus culturally resembling the *Staphylococcus albus*, but distinguished from it by agglutination

¹ For additional information concerning research in acne, see Gilchrist, Trans. Amer. Derm. Assoc., 1902, p. 105; Jour. Cut. Dis., 1903, xxi, p. 107, with a review of work done in this field by other observers; Flemming, Lancet, London, 1909, i, p. 1035; and Brit. Med. Jour., 1910, i, p. 1382; Western, Brit. Jour. Derm., 1910, xxii, p. 6; Whitfield, International Clinic, 1909, xi, p. 183; Molesworth, Brit. Med. Jour., 1910, p. 1227; Engman, Jour. Cut. Dis., 1910, xxviii, p. 553; Lovejoy and Hastings, *ibid.*, 1911, xxix, p. 80; Morris and Dore, Brit. Jour. Derm., 1911, xxiii, p. 311; Haase, Jour. Cut. Dis., 1913, xxxi, p. 1015.

² Ann. de l'Inst. Pasteur, 1897, p. 134.

³ Allbutt and Rolleston's System, 1911, p. 8.

⁴ Jour. Cut. Dis., 1902, xx, p. 99.

⁵ Jour. Amer. Med. Assoc., 1912, lix, p. 504 (a good review of research work in acne).

⁶ Med. Klin., 1908, p. 1747.

⁷ Derm. Studien (Unna, Festschr., 1911, p. 311).

In aggravated cases, in which suppuration has been extensive, small pitted scars are left after the disappearance of the disease.

The lesions of acne are found most commonly upon the face, but they are seen frequently upon the neck, the shoulders, the back, and front of the upper chest, the genitals, and the extremities, and occasionally on other parts of the body, the palms and soles being excepted. The disease is intermittent in severity, the patient being at times relatively free from symptoms and at others conspicuously disfigured. It is

FIG. 276



Scars following acne vulgaris (untreated).

frequently associated with mild or severe alopecia pityroides and pityriasis steatoides, the totality of symptoms depending upon similar causes in the susceptible subject.

In acne certain clinical forms are recognized; these are conveniently designated by various terms, which refer chiefly to external features.

Acne Punctata.—In this variety the apex of the developing papule exhibits the characteristic blackish punctum of the comedo about which the papule is forming.

it is true, indelible, but even these are smoothed down in the process of time, so that they become yearly less conspicuous and disfiguring. In all instances, whether the case is mild or severe, the physician who takes charge should explain to the patient that the disease *per se* tends to produce scarring, and that the best preventive of unsightly cosmetic results is intelligent treatment.

The general treatment of acne requires a careful and exhaustive study of the special requirements of each individual case. A thorough investigation of the habits of living—food, diet, bathing, occupation—and bodily functions, according to the methods described in the chapter devoted to General Diagnosis, is essential at the outset.

An important consideration, in undertaking the treatment of a patient affected with acne, relates to any local or internal medication previously employed. A large proportion of all patients first claim the attention of the physician after ingesting drugs or making topical applications which have decidedly aggravated the original trouble. With or without the advice of others, such patients have often been taking various internal preparations calculated to "drive out" disease, many of them containing potassium iodid; or for the relief of headache have resorted freely to the use of proprietary preparations charged with acetanilid or potassium bromid; or have rubbed over the skin some patent salve containing tar. In every such instance treatment should be directed toward the relief of the artificial acne, after which the real condition of affairs can be recognized more clearly. The patient should be told to discontinue any former practice, to bathe the affected part with hot water at night, and after the surface is dried to apply any bland unguent. By these simple measures alone many cases of acne can be improved greatly, and some be relieved completely.

The question of diet is of the highest moment. The kind and quantity should be suited to the occupation of the individual, as for the school-boy and the school-girl, or the adolescent employed in factory or on the farm or in domestic labor. All overfed subjects of acne are benefited in a high degree by reducing the quantity of food ingested, especially meats and sweetstuffs. (A milk-diet, or one composed largely of fresh fish, fruits, and the lighter vegetables, will usually brighten up the obstinate case. Confectionery, highly spiced food, pastry, hot bread and cakes, sugars, and fried articles are all excluded with great advantage. ~~Alcohol~~ and ~~tobacco~~ are generally to be prohibited.

Since dyspepsia and constipation are frequently causal factors in the disease, it is necessary to correct these disorders when present. A blue-mass pill or calomel on several consecutive nights, followed by a saline laxative in the morning, is usually indicated at the outset of treatment. The cascara compounds are especially valuable when it is necessary to continue the use of a laxative for more than a few

look
diet
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Alcohol

cases, especially in those in which the patient is subjected to the hot or Turkish bath; the latter is especially of this class.

Patients should be given sufficient sleep at regular intervals, and when possible short periods of rest should be maintained. In some of these cases the intense itching of the acne, can be made to disappear within a few minutes of complete physical and mental rest. In a half an hour of comparative inactivity, whether by boy or girl, relief of acne often can be best obtained during the school hours, and by carefully selecting the subjects adapted to the physical and intellectual condition of the patient.

If a complication exists, should receive proper treatment. In these cases, should attention be paid to the general condition of this class are often chlorotic young women, or overworked at the school-desk, the treatment should be counteracted.

The relief of the disorder should be determined by the condition of the patient. Remedies to combat the various conditions have been mentioned. Cod-liver oil, iron, the mineral acids, and the bitters are of value in cachexia. Calcium sulphid, long highly recommended for the relief of acne, is now discarded. Arsenic is of value in many cases. The internal employment of glycerin for the relief of acne has occasionally been recommended. Glycerin in teaspoonful to tablespoonful doses has been recommended. Ichthyol is used

whether previously treated or not, the local treatment is of great importance in the perfection with which its details are carried out. It is not the selection of one of the remedies, but the relief of the disease, nor yet the selection of one for another to meet any transitory indication, but produces the best result; it is rather the use of the recognized value, and its skillful adaptation to the condition of the disease.

In the local treatment of acne to evacuate the contents of the sebaceous ducts, to express from the summits of papules (the contents of sebaceous ducts) all densely inspissated contents, and to remove any comedones present with the aid of a lancet.

In many cases this operative treatment, when applied to comedones, is easier and more satisfactory than hot bathing and the ointment applications mentioned in the foregoing paragraphs. For the purpose of opening the ducts of purulent collections, an ordinary cambric needle is decidedly preferable to a knife, and for the larger collections a delicate and very narrow blade should

days. Some modification of Startin's acid mixture, such as the following, will be found suitable for other cases:

R—Magnes. sulphat.,	3ij;	60	33
Acid. sulphur. dil.,	f3ij;	8	
Sodii chlorid.,	3j;	4	
Ferri sulph.,	gr. v;		
Tinct. cardamom. co.,	f3j;	4	
Aq. dest.,	ad f3viii;	ad 240	
Misce et filtra.			

Sig.—A tablespoonful in a tumblerful of water before breakfast.

Other cathartics, saline and alterative, will often prove serviceable. The mineral waters, Hathorn, Karlsbad, Hunyadi János, Racoczy, or Kissingen, a tumblerful before breakfast, are exceedingly valuable in cases of habitual intestinal torpor. When there is an acid form of dyspepsia, the rhubarb-and-soda mixture, or milk of magnesia in dessertspoonful (8.) doses, will be serviceable. Mercurous iodid in small doses, true sodium salicylate, and the dilute nitro-hydrochloric acid are often of value. Some cases improve rapidly on taking each night enough castor oil to cause a daily free evacuation of the bowels. Salol and other intestinal antiseptics are sometimes effective.

In those cases of acne in which inactivity of the large intestine is a factor, thorough irrigation of the bowel, together with daily exercises which will strengthen the abdominal muscles and stimulate peristalsis, is often followed by complete recovery. For these patients abdominal massage is of great value. Large quantities of pure water drunk between meals aid greatly in the matter of elimination. Iced drinks should be avoided. As a rule, it is advisable to take but little liquid with the food; the unwholesome habit of rapidly bolting a meal without proper mastication is thus largely overcome. In many instances, however, a cup of warm, but not strong, tea, cocoa, or coffee at the close of the meal is helpful to digestion. Where gastric motor and secretory insufficiency is present, pepsin, nux vomica, and dilute hydrochloric acid are valuable remedies. Pancreatin and diastase may be used if intestinal indigestion exists.

Daily exercise in the open air is necessary to stimulate sluggish glandular systems into proper functional activity. Such exercise to be of value should be carefully adjusted, both in kind and in amount, to the needs of the individual.

A most important part of the treatment in every case is, without question, the daily bathing of the entire surface of the body (with exception of the face, which requires special attention, as elsewhere shown; and excluding the menstrual period in women) with water as cool as can be tolerated, followed by rapid sponging, and by brisk friction with coarse towels or with a flesh-brush until the skin is glowing. Common salt may be added to this bath in the strength of $\frac{1}{4}$ pound of salt to each gallon of water, unless contraindicated by irritability of the general body-surface. The results of this treatment

are excellent in the majority of cases, especially in those in which the patient has been accustomed to the hot or Turkish bath; the latter may aggravate affections of this class.

In nervous and overworked patients sufficient sleep at regular hours should be secured, and when possible short periods of rest during the day should be obtained. In some of these cases the indigestion, and consequently the acne, can be made to disappear with no other treatment than ten minutes of complete physical and mental relaxation before meals, and half an hour of comparative inactivity after eating. In a growing boy or girl, relief of acne often can be best accomplished by shortening the school hours, and by carefully selecting studies and occupation adapted to the physical and intellectual development of the individual.

Pelvic disease, when this complication exists, should receive proper treatment; especially, in these cases, should attention be paid to the general health, as patients of this class are often chlorotic young women, leading sedentary lives, or overworked at the school-desk, the sewing-machine, or the shop-counter.

Internal medication for the relief of the disorder should be determined largely by the general condition of the patient. Remedies to combat abnormal gastro-intestinal conditions have been mentioned. Cod-liver oil, iron, strychnin, phosphorus, the mineral acids, and the bitters are needed in chlorosis and cachexia. Calcium sulphid, long highly esteemed in the management of acne, is now discarded. Arsenic however, is a valuable drug in many cases. The internal employment of ergot in full doses for the relief of acne has occasionally been followed by excellent results. Glycerin in teaspoonful to tablespoonful doses three times daily has been recommended. Ichthyol is used empirically with success.

In all cases, whether previously treated or not, the local treatment is of prime importance, and in the perfection with which its details are observed lies the key to success. It is not the selection of one of the several remedies advocated for the relief of the disease, nor yet the successive substitution of one for another to meet any transitory indication in each case, that produces the best result; it is rather the use of a single method of recognized value, and its skillful adaptation to the changing conditions of the disease.

It is always necessary in the local treatment of acne to evacuate the contents of pustules, to express from the summits of papules (in which are the orifices of sebaceous ducts) all densely inspissated plugs of sebum, and to remove any comedones present with the aid of the comedo-extractor. In many cases this operative treatment, especially the removal of comedones, is easier and more satisfactory after several days of the hot bathing and the ointment applications recommended in the following paragraphs. For the purpose of opening the superficial and smaller purulent collections, an ordinary cambric-needle of good size is decidedly preferable to a knife, and for the larger abscesses a bistoury with a delicate and very narrow blade should

be used. By counter-depression with the fingers the whitish-yellow or blackish orifice of the duct may be detected, and at this point the needle or the bistoury should be thrust sufficiently deep to insure removal of the contents. Should blood flow in droplets from any of these slight wounds, it is to be encouraged rather than repressed, as relieving the hyperemia and engorgement of the small periglandular phlegmon. In one or several sittings all lesions requiring such interference may be opened, and immediately after each operation, preferably while pus and blood still are oozing, the part is to be bathed for several minutes with water as hot as can be borne with comfort. For many reasons the hour before retiring is preferable, though not always practicable, in treating such cases, as then a soothing application can be made which may remain until the following morning. One or several of these operations will do much to relieve the skin of its engorgement and retained inflammatory products.

One of the most valuable methods of local treatment consists in first stimulating the sluggish skin until a slight dermatitis is produced, after which soothing applications are made until the reaction has subsided. By thus alternately stimulating and soothing the diseased portion of the skin, distinct improvement usually results in a relatively short time. [This is accomplished by having the patient bathe the face with hot water for several minutes on each of three or four successive nights.] During the bathing a shampoo of the tincture of green soap or other soap may be employed. After rinsing and drying the face, an ointment containing sulphur or resorcin in the strength of 5 grains (0.33) to 1 drachm (4.) to the ounce (30.) of cold-cream salve and vaselin is applied. [In the morning the face may be washed with hot water, followed by cold.] When moderate reaction occurs, which will be evidenced by a feeling of stiffness or the appearance of redness and scaling, this treatment is suspended and soothing applications, such as the zinc-oxid and aqua calcis lotion, or a soothing ointment, are substituted. After the subsidence of the reaction, the stimulating treatment is repeated. As improvement occurs, the vigor of the treatment may be lessened; first stopping the shampoo, later the hot applications, and finally substituting less stimulating preparations for the sulphur and resorcin. In those cases where it is desired to produce stimulation and exfoliation quickly, the paste recommended by Lassar is useful—that is, 1 part of beta-naphtol, 2½ parts each of vaselin and sapo mollis, and 5 parts of precipitated sulphur. This is spread over the skin for from fifteen to twenty minutes, and then wiped off, when the surface is dusted with a simple powder. Soothing applications may be used with advantage before a second application. Lotions of mercuric chlorid are of value where antiseptic and keratolytic effects are desired.

Sulphur is rightfully accorded the first place among the remedies for the local treatment of disorders of the sebaceous glands, and with the exception of the ointment above mentioned is a constituent of the preparations of real worth in the management of acne. One of the

best is Vleminckx's solution, of which from 15 to 60 drops in a tablespoonful of hot water may simply be mopped on the face and allowed to remain over night, or may be applied with gentle friction and massage.

The following lotion is of service in resolving cases:

R—Sulphuris loti,	3ij;	12	
Sodii borat.,	3ij;	8	
Glycerin.,	f 3vj;	24	
Aq. dest.,	ad f 3vj;	ad 180	M.

Sig.—Shake well and apply freely, leaving a thin film of powder over face.

Duhring recommends the following:

R—Sulphur. præcip.,	3ij;	8	
Glycerin,	f 3ij;	8	
Alcoholis,	f 3j;	30	
Liq. calcis,	f 3j;	30	
Aq. ros.,	f 3ij;	60	M.

Sig.—Shake the vial before using.

This mixture made up without the liquor calcis has always proven efficacious.

Resorcin, next to sulphur, is probably the most valuable remedy in acne as in other sebaceous-gland disorders. It may be used in the above formulæ in place of sulphur, or combined with it in strength varying from 2 to 10 per cent. Ichthyol and thiol are similar in their action to sulphur, and sometimes succeed when the latter fails. They may be used in ointments, in lotions, or combined with glycerin. The discoloration produced is easily removed, as both substances are soluble in water.

Ammoniated mercury, 2 to 15 per cent., in lanolin, or other simple ointment, is an effective remedy. Mercuric chlorid is very generally employed in the strength of from $\frac{1}{8}$ to $\frac{1}{2}$ grain (0.008–0.033) to the ounce (30.) of emulsion of bitter almonds as a lotion; and the protiodid and biniodid of mercury are similarly applied in lotions and unguents, in the strength of from 5 to 10 grains (0.33–0.66) to the ounce (30.). One should be careful not to make use of mercurials at the same time that a compound of sulphur is used, lest a chemical combination occur, by reason of which mercurous sulphid (ethiops mineral) is precipitated upon the skin and produces the appearance of comedo.

Van Harlingen employs with success in acne 1 drachm (4.) each of potassium sulphid and zinc sulphate to 4 ounces (120.) of rose-water. Fox applies $\frac{1}{2}$ drachm (2.) of chrysarobin to the ounce (30.) of collodion. Taylor advises from 5 to 25 grains (0.33–1.66) of zinc iodid to the ounce (30.) of vaselin.

For mild cases an excellent lotion is obtained by adding 2 drachms (8.) each of simple tincture of benzoin and glycerin to 4 ounces (120.) of distilled water, to which, where a more stimulating effect is desired, 1 ounce (30.) of cologne-water or of alcohol may be added, or 1 scruple (1.33) of potassium sulphid.

In the milder forms of acne, and especially where the disease involves the trunk, precipitated sulphur alone, or, better, in combination with other powders in varying proportions, is of great service when dusted on the affected parts daily. The diluent may include one or more of the following: starch, rice flour, zinc oxid, zinc stearate, and talc.

Vaccines.¹—Since the introduction of this method of treatment, a very large number of cases have been treated by it all over the world. The results have been at once pleasing and disappointing. The principle of the treatment appears to be sound, but the technique of its employment has not been worked out. The best results recorded are those by Engman,² who employs the following technique: Using a vaccine prepared with the acne bacillus alone, he employs as an initial dose three million. On the third day the comedones are expressed, all lesions opened, and hot applications made to produce local hyperemia. The latter are continued until the fifth or seventh day, when new lesions begin to appear, signifying a stage of depression, which is the indication for a second injection. From three to five million are now given. After several doses new lesions cease to appear. If after a few injections new lesions continue to appear, after the third day the dosage is increased to from seven to ten million, but this is rarely necessary.

Gilchrist³ in the beginning used from one hundred to two hundred million, but finding this too large a dose has since decreased the amount. He now recommends that the initial dose be ten to twenty million, after which one should wait for the negative phase, which occurs anywhere from the third to the eighth day and is indicated by the appearance of new lesions. When these subside, another injection is given, and so on for three or four injections, after which a period of rest is suggested. When relapses occur, one or two injections a week apart are given. He further states that there is no doubt about the great value of the *Bacillus acnes* vaccine in the inveterate nodular type of acne, where the bacillus exists in pure culture.

Morris and Dore⁴ state that they can claim nothing more for vaccine therapy in acne than that it is a useful adjuvant of ordinary forms of treatment. In MacLeod's⁵ experience, vaccine treatment in acne has been disappointing. The major portion of investigators have concluded that vaccine made from the acne bacillus is indicated in the lesions in which suppuration is not yet actively progressing; while vaccine made from either the particular staphylococcus found in these cases or the ordinary *Staphylococcus albus* or *aureus* should be employed

¹ For results and technique, see the following papers: Flemming, *Lancet*, 1909, i, p. 1035; Lassueur, *Annales*, July, 1910, p. 377; Engman, *Interstate Med. Jour.*, xvii, No. 12; Western, *Brit. Jour. Derm.*, 1910, xxii, p. 6; Lovejoy, *Amer. Jour. Med. Sci.*, May, 1912, cxliii, p. 693; Whitfield, *Trans. XVII Internat. Cong. of Med.*, London, 1913, Sec. 13, Part 1, p. 193; Smiley, *Jour. Amer. Med. Sci.*, 1912, lviii, p. 1274.

² *Jour. Cut. Dis.*, 1910, xxviii, p. 553.

³ *Ibid.*, p. 568, and *Trans. XVII Internat. Cong. of Med.*, London, 1913, Sec. 13, Part 2, p. 405.

⁴ *Brit. Jour. Derm.*, 1911, xxiii, p. 311 (with bibliography).

⁵ *Trans. XVII Internat. Cong. of Med.*, London, 1913, Sec. 13, Part 2, p. 423.

when that stage is reached. In a large personal experience, vaccine therapy has shown both brilliant and negative results. Improvement follows sufficiently often to demonstrate the value of the method when a proper technique shall have been worked out. It is therefore recommended in its present state as one of the methods of treatment to be employed in selected cases and in association with older, well-recognized procedures.

Radiotherapy in the treatment of acne still holds a prominent place, notwithstanding the fact that it has been given up by the major number of practitioners. With the present control over dosage, there is no reason why it cannot be given entirely within the bounds of safety. It is recommended only in selected cases, and in these should be given in moderate dosage and only for reasonable periods of time. Sufficient treatment to produce a dermatitis or a subsequent telangiectasis or atrophy should not be given and is not necessary to achieve the object of the treatment, which is the elimination of the disease.

Prognosis.—The majority of patients, even when untreated, eventually recover. This natural involution of the disease is commonly attained as the body arrives at maturity. Appropriate treatment has, however, a satisfactory influence in hastening the recovery of practically all patients; it also lessens the degree of subsequent scarring. A certain amount of cicatrix-formation must be looked for in severe cases; occasionally, keloid occurs as an unpleasant sequel to the disease. Exceedingly rebellious and even grave cases occur in the cachectic, those long and improperly treated, and those who from necessity are continuously exposed to influences unfavorable to the involution of the disorder, such as the subjects of epilepsy habitually ingesting potassium bromid, and the victims of syphilis requiring persistent use of the salts of iodine.

Acne Rosacea.—**Synonyms:** Rosacea, Gutta Rosea, Telangiectasis Faciei, Nevus Araneus, "Brandy-nose," "Copper-nose." Fr., Acné Rosée, Couperose; Ger., Kupferrose, Kupferfinne.

Definition.—Acne rosacea is a chronic disease of the skin of the face, often developed from or associated with the lesions of acne vulgaris, and is characterized by hyperemic areas, or patches of dull-red erythema, telangiectases, inflammatory papules, or growths which may attain the size of a hen's egg.

Symptoms.—Acne rosacea is displayed most often upon the nose, cheeks, and chin, but may occur on any parts of the face, and rarely on the lateral regions of the neck. It is seen usually in middle life, and rarely before the twenty-fifth year. In a first stage there is a more or less diffuse pinkish or dusky, but transitory, redness, involving the extremity of the nose and its contiguous parts, which coloration may extend from this region in a somewhat symmetrical figure over the brow, cheeks, and chin. The redness may be spread uniformly over the regions involved, or be displayed in irregular, ill-defined blotches, which vary greatly in size and shape. The spots may be rounded,

radiating, stellate, linear, tortuous, or of fantastic outline. The colors vary from a delicate rosy-pink to a deep purplish-crimson. Minute capillaries often ramify over the erythematous surface. The effect is a marked unsightliness, for which chiefly, the advice of the physician is sought, as the affected parts give rise to few or no subjective sensations. Under pressure with the diascope, the color disappears. The surface seems cool rather than hot; and the sebaceous glands are seen to be affected, as there is usually present either a seborrhea oleosa or an accumulation of yellowish-white, moderately inspissated sebum in the patulous orifices of the gland-ducts.

The disorder varies greatly with the general condition of the patient. At times it may scarcely be perceptible; again, after the stimulation produced by ingested food or by alcohol, after mental excitement, a paroxysm of coughing or laughing, or exposure to external irritation, the lesions may be conspicuously deforming. This condition may endure for months or years and then disappear, or may be succeeded by a second stage of the malady.

In a second stage the redness becomes permanent, though subject to frequent variations in intensity. The capillaries dilate passively and appear as conspicuous, tortuous, straight, or anastomosing lines of reddish color about the nose, cheeks, chin, or forehead. Firm, purplish-red, painless, pinhead- to pea-sized nodules or papules, at times pustules, often rise from the erythematous surface, and they either display minute superficial and tortuous blood-vessels in their integument, or they project from a base about which such a telangiectasis has been very irregularly developed. The lesions are apt to be intermingled with those of seborrhea oleosa, comedo, or acne vulgaris. When fully developed, this stage of the disease, though generally not productive of marked subjective sensation, produces an exceedingly conspicuous disfigurement.

In the third stage (which is the most pronounced of the three), roundish, sessile or pedunculated, lobulated or pendulous, firm, elastic, pinkish-red, bluish, livid, or violaceous vegetations, traversed by a finer or coarser network of blood-vessels, slowly develop about the affected part of the face, chiefly the nose. These vegetations may be single or multiple, and in the latter case may be isolated or so closely united as to be scarcely distinguishable from one another. The acneiform lesions seen in the second grade of the disease may here also be apparent. The nose is often cold to the touch when bright-red in hue; and it may be oily or greasy in appearance in consequence of a seborrhea oleosa of the part. The so-called "brandy-drinkers'," "wine-drinkers'," and "whiskey-drinkers'," noses are of this class. In some cases there is a uniform and symmetrical hypertrophy of all the soft parts of the nose, which may thus attain colossal proportions. It is these extreme consequences of acne rosacea to which the term *rhinophyma* has been applied.

The course of the disease is slow, and in the larger number of patients does not produce the exaggerated types of the second and third grades.

The lesions may persist indefinitely as indolent symptoms of the malady in any one of its stages; or, in a case in which there has been no new growth of vessels or of tubercles, may proceed to spontaneous involution. Not infrequently there occurs an associated conjunctivitis¹ or keratitis,² which clears up on the disappearance of the rosacea.

Etiology.—The first and second grades of acne rosacea are common in women either at puberty or near the period of the menopause, in those who are pregnant, or in those who suffer from utero-ovarian disease, or chlorosis.

FIG. 278



Rhinophyma.

The disease is seen also in men of early and of late adult life. In both sexes it may occur in anemic and asthenic states; in both, also, its association with gastro-intestinal dyspepsia, constipation, and the immoderate use of strong tea and alcoholic drinks, is a matter of common observation. The new growth of vessels and tubercles, with the rhinophyma of the advanced grade of the disease, is much commoner in men than in women. In those whose faces are bronzed by exposure to the weather, the telangiectatic condition of the cheeks,

¹ Little, Brit. Jour. Derm., 1908, xx, p. 265.

² Schamberg, Jour. Cut. Dis., 1913, xxxi, p. 504.

rather than of the nose, is of frequent occurrence. Veteran sailors and soldiers are thus commonly affected. Persons who have frozen the nose or the cheeks on one or more occasions, and those suffering from trauma of these parts, are similarly liable to telangiectasis. Any externally or internally operating cause which tends to retard the capillary circulation in the superficial portion of the skin is capable of inducing this result, whether this retardation be due to direct or reflex vasomotor nerve action, or to toxins operating directly upon the vessel-walls. Acne rosacea at times is displayed conspicuously in the mulatto. A bacillus was isolated from lesions in a case of rosacea by Galloway and Goadby.¹

Pathology.—In the first stage of acne rosacea there is merely passive hyperemia. The circulation in the superficial capillary plexus is retarded. Persistence of this condition for long periods of time results in paresis of the capillaries, with their consequent dilatation and hypertrophy, phenomena which characterize the second stage, the sebaceous-gland disorder being a complication of the process. In the third stage, the nodules are composed of newly formed gelatinous elements, which later are replaced by organized connective tissue.² Dilatation and hypertrophy of the sebaceous glands, with dilatation, hypertrophy, and new-growth of the superficial blood-vessels, and enlargement of those trunks which ascend from the corium, are also found. There is no marked epithelial hypertrophy (Unna).

The disease is viewed differently by various authors. By some its obvious connection with acne vulgaris is denied; by others it is regarded as a seborrhoic dermatitis. According to Besnier and Doyon, this disease represents the following: superficial or deep, at first intermittent, later persistent, hyperemia; sebaceous hyperemia (acne-eczema), in which there are unquestioned steatorrhea and implication of the sebaceous glands, with infiltration and possibly exfoliation of the skin; deep hyperemia, with infiltration of the corium and plastic products about vessels, follicles, and perifollicular tissue; telangiectasis, as described above; and hypertrophy of the perifollicular derma, with connective-tissue new-growth.

Diagnosis.—Acne rosacea is distinguished from acne vulgaris by the presence of telangiectasis and of the hypertrophic growths which characterize fully developed lesions in the former. The nodular syphiloderm is recognizable by its tendency to ulceration and crusting and by the entire absence of telangiectasis. When the tubercles of syphilis are limited to the extremity of the nose (they are usually small in consequence of the influence of treatment), they often degenerate into characteristic, split-pea-sized, irregularly circular ulcerations, which are superficial in seat and frequently isolated. They leave similarly shaped and sized depressed cicatrices at the tip and neighboring parts of the nose. As the process is much more rapid than in acne

¹ Brit. Jour. Derm., 1908, xx, p. 408.

² For histopathology of the severe type—rhinophyma—see Salzer, Archiv, 1901, lvii, p. 409 (with review of literature).

rosacea, these lesions, considered in connection with the absence of telangiectasis, furnish the most significant diagnostic symptom of the disorder, for they often occur late in the history of syphilis, in individuals in middle life, and in varying shades of a dull reddish color, circumstances particularly favoring confusion regarding the identity of the two diseases. Asymmetry of lesions more frequently characterizes syphilis than rosacea.

Zoster, from involvement of the superior maxillary branch of the trigeminus, with diffused redness of one side of the nose and efflorescence of vesicles over its tip and ala, strongly resembles acne rosacea with pustular lesions; but in zoster the painful character of the disorder, its limitation to one side of the face, its transitory career, and its vesicular lesions are characteristic.

Lupus vulgaris, like syphilis, when occurring upon the nose, is to be recognized by the tendency of its papulo-tubercular lesions to ulceration and crusting, by the absence of vascularity, and by the frequent presence of characteristic cicatrices. Unlike syphilis and acne rosacea, however, the history of lupus vulgaris usually extends from early childhood. Lupus erythematosus is characterized by a definite outline, by a superficial infiltration and elevation of the border of the patch, by an atrophic or scarred centre, by adherent scales, and by its symmetrical diffusion over much larger and better defined areas, commonly extending from the bridge of the nose well on to the cheeks.

Treatment.—So far as there can be said to be any internal treatment of acne rosacea, it is that employed in acne vulgaris; but in neither disease can such treatment be confidently described as effective in the dispersion of the local lesions. The treatment is that of the patient rather than of his disease. When alcohol has been in any degree productive of the local effects, its use is to be interdicted; but as regards confirmed rosacea this prohibition will prove to be of little avail. The disease when resulting from spirit-drinking may persist after years of total abstinence.

The diet should be of the character proper for the patient with acne. All imbibition of hot liquids, even tea and coffee in excess, should be restricted as tending to congest the blood-vessels of the face. Everything having the same result in the habits, the occupation, or the clothing of the patient should be, as far as possible, deprived of influence, as, for example, the wearing of tight collars and corsets, or working over hot fires.

In many patients who are the subjects of rosacea, as distinguished from the younger class of sufferers from acne vulgaris, there are evidences of lithemia, gout, and similar conditions which require even stringent rules in many particulars for the conduct of life. The use of sugar in many of these cases is to be restricted; meat should be forbidden or permitted but once in the day; and other articles of food be selected with special care. The use of tobacco should be restricted in the case of male patients with well-marked symptoms, and the

daily general bath described in the preceding chapter as of importance in the treatment of acne should here also be prescribed.

All gastro-intestinal disturbances should receive appropriate attention. In acne rosacea, even more than in acne simplex, dyspepsia and constipation are conspicuously effective factors.

Internally, nux vomica, ergot and ergotin, ichthyol (ammonio-sulphonate), mineral acids and alkalies, and arsenic have been recommended. Most of these drugs are valueless in removing the symptoms of the disease unless their use is indicated by the general condition of the patient. In gouty patients blue pill and alkalies, though not of themselves capable of relieving the rosacea, may serve to aid the patient; the same may be said of the use of iron in chloro-anemic women.

The local treatment of acne rosacea is substantially that of acne vulgaris. Stimulating lotions of green soap, formalin, alcohol, mercuric chlorid, or sulphur (Vleminckx's solution is especially serviceable), in connection with ablutions in hot water, are of the highest value. In addition, the various ointments containing sulphur, resorcin, mercuric oxid, and iodids, and the continuous application of mercurial plaster should be employed if necessary.

Van Harlingen reports rapid results from the application, several times in the day, of a lotion composed as follows:

R—Sulphuris præcipit.,	3j;	4	
Camphoræ pulv.,	gr. v;		33
Tragacanth. pulv.,	gr. x;		66
Liq. calcis,			
Aq. rosæ,	aa f3j;	aa 30	M.

G. H. Fox applies chrysarobin in traumaticin, $\frac{1}{2}$ drachm (2.) to the ounce (30.); but this drug should be reserved for intractable cases, as it may produce severe dermatitis. After the production of this reaction, however, the benefits secured may be appreciable for months.

In the second stage of the disease the treatment is the same as in the first stage, but when all the inflammatory phenomena have yielded and the causes of the local congestion have been removed, the vessels and remaining nodules may be destroyed by single or by multiple puncture of each with a fine cambric-needle attached to the negative pole of a galvanic battery with six to ten elements in the circuit. This operation is better than the knife, and it may be regarded today as the effective method of removing blemishes produced by dilated blood-vessels in this stage of rosacea. The method is simple, readily executed, requires no anesthetic, and is in many ways superior to other methods, to which resort should only be had when electrolysis cannot be employed. Some vessels may be destroyed completely, with the production of so slight a cutaneous cicatrix that in the course of a few months it cannot be recognized by the unaided eye. For details of this simple operation, the reader is referred to the

chapter on Hypertrichosis. For the cambric-needle may often be substituted with advantage a platinum hypertrichosis needle. The vessels may be entered in one or several places, and the operation be repeated until the last thread-like evidence of their existence has disappeared. The number of cells brought into the circuit must be graduated somewhat to the requirements of each case and to the locality of the skin operated upon. Fewer cells can be tolerated for the lip and alæ nasi than for the root of the nose, the cheeks, or the forehead.

Brushing the part cautiously with solutions of potassium hydroxid, from 10 to 30 grains (0.66–2.) to the ounce (30.) of water, and the local use of pure phenol, and chromic, pyrogallic, and glacial acetic acids, acetum cantharidis (Taylor), sulphur iodid, or solution of mercurous nitrate, are forms of treatment which have been recommended, but it is needless to say that use of such powerful agents must be attended with the utmost caution. Before these drugs are employed an effort should be made to produce exfoliation by spreading over the part a plaster made of green soap. Unna's mercurial plaster-mull is similarly applied. Kaposi highly recommends the solution of iodated glycerin employed by him in acne vulgaris (*q. v.*), which solution is painted over the part from eight to twelve times daily for three or four successive days, and is immediately covered with gutta-percha tissue.

Multiple scarification of all new-growths of the third stage, after the manner of attacking lupus nodules, erosion with a dermal curette or with a Braun spoon, and surgical ablation or decortication of tumors by ligature and knife, are also available. After any destructive attack upon the diseased portions of the skin soothing lotions, fomentations, or ointments should regularly be applied. Radiotherapy is valuable in selected cases, particularly where thickening has occurred, and is used in the same manner as in acne vulgaris.

Prognosis.—A favorable prognosis can be given in cases in which the disease occurs in its milder forms. Even in cases complicated by marked telangiectasis and hypertrophy, the results of treatment are often in the highest degree encouraging. Notwithstanding the most energetic procedures, however, the *vis-a-tergo* of passive hyperemia, involving often the deeper and unassailed blood-vessels, may work its slow progress. For women the future is in general more promising than that of men. With the most unfavorable prognosis, however, it is to be remembered that the disease is one of deformity rather than of physical discomfort.

Acne Varioliformis.—**Synonyms:** Acne Frontalis, Acne Rodens, Acne Necrotica, Acne Atrophica, Folliculitis Varioliformis, Necrotic Granuloma, Impetigo Rodens. Fr., Miliare Scrofuleuse, Folliculite Cicatricielle Nécrotique.

Symptoms.—Acne varioliformis is characterized by the occurrence over the brow, scalp, or other regions, of discrete, exceedingly indolent,

reddish-brown, papulo-pustular, often umbilicated, lesions, which become covered with crusts, and eventually leave depressed, superficial scars, resembling those of smallpox. This disease is not to be confounded with that to which Bazin and other French writers once gave the name *Acne varioliforme*, viz., *Molluscum epitheliale* (*Molluscum verrucosum* of Kaposi).

The disease is relatively rare, and may be characterized by the development of few (but one or two) or very many lesions. In some instances the peripheral extension of a single papulopustule may produce a narrow, annular, seropurulent chamber with a depressed firm centre. There is commonly a well-marked coincident seborrhea.

FIG. 279



Acne necrotica.

Many of the lesions are traversed by lanugo-hairs. The subjective sensations are slight; at times there is itching. The disease tends to recur and is exceedingly chronic in course.

In exceptional cases the disorder occurs in other regions than those named above; for example, over the dorsal and sternal aspects of the trunk (where large scars are apt to follow),¹ about the nose, and within and about the concha of the ear, the interscapular region, and the extremities. In one of Dr. Hyde's patients (the subject of the accompanying illustration), the disease left very disfiguring scars on the right ala of the nose. In some cases the affected regions are

¹ Fox, Brit. Jour. Derm., 1909, xxi, p. 118; Little, *ibid.*, 1913, xxv, p. 362.

invaded so thickly that the resulting scars produce a cribriform aspect in the integument. Occasionally, the arrangement of the lesions is linear or circinate.

The variations displayed are exceptional, but worthy of note. Severe confluent, serpiginous, and very extensive developments of the malady may be seen. According to Boeck, the hue of the papulopustule is due to minute capillary hemorrhages, which later become invisible in consequence of tumefaction of the overlying integument.

Etiology.—The sexes are represented nearly equally among the subjects of the disease, who are, as a rule, in or near middle life. Gastro-intestinal disorders are believed to have some etiologic relation to the disorder. The causes of the disease are obscure, but that its origin, as with necrotic granuloma and folliclis, is in part microbic, is well-nigh established.

Pathology.—Fordyce¹ and Sabouraud state that the disease begins in the upper part of the hair-follicle, from which point it extends to the entire follicle and to the sebaceous gland. Various microorganisms are found in the lesions, but the active agent is apparently a staphylococcus. Sabouraud² believes the disease is always preceded by seborrhea, due to infection with his microbacillus.

The histological changes are similar to those of ordinary acne, except that the process is limited distinctly in extent, and almost invariably terminates in a small central area of necrosis and subsequent scar-formation. Some of these cases may be due to the presence of the toxins of tubercle bacilli. Acne varioliformis occurs in typical development upon the faces of the tuberculous.³ For further details in this connection, the paragraphs devoted to the tuberculides of the skin (necrotic granuloma, folliclis) should be consulted.

Diagnosis.—The lesions are to be distinguished from the syphiloderm named above, from acne vulgaris, and from variola. The points of distinction are: the absence of fever, present and precedent; the absence of other symptoms of syphilis; the localization of the eruption; and the absence of intermingled comedones and other symptoms of acne disseminata. The involvement of the scalp-surface is not alone sufficient to distinguish it, as syphilodermata and occasionally comedones are visible in the scalp above the brow.

Treatment.—As a rule, the disease yields readily after the use of antiseptic lotions or of ointments containing ammoniated mercury, resorcin, sulphur, mercuric chlorid, formaldehyd, or boric acid, though lesions are likely to develop after suspension of treatment. In severe cases caustics or galvano-puncture may be required. Crocker employs potassium iodid internally with happy results. Engman and Mook⁴ report success following treatment with staphylococcus vaccine.

¹ Jour. Cut. Dis., 1894, xii, p. 152.

² Annales, 1899, s. iii, x, p. 845.

³ Schamberg, Jour. Cut. Dis., 1910, xxviii, p. 414 (A case of acne varioliformis, with a coincident papulo-necrotic tuberculid).

⁴ Jour. Cut. Dis., 1913, xxxi, p. 269.

DISEASES OF THE HAIR AND HAIR-FOLLICLES.

HYPERTRICHOSIS.

Synonyms.—Hypertrophy of the Hair, Superfluous Hair, Hairiness, Hirsuties, Hypertrichiasis, Polytrichia, Trichauxis. Fr., Poils Accidentels.

In the condition of hairiness the pilary filaments may be increased in number or size, or be developed abnormally with respect to the region, age or sex of the person who is the subject of the anomaly.

Symptoms.—Hypertrichosis may be congenital or acquired, and partial or universal. In congenital hairiness it is common to see infants at birth with extremely long hairs on the hairy part of the body, this growth being usually replaced later by shorter filaments. Partial congenital hirsuties is illustrated in pigmentary nevi. Universal congenital hirsuties is a rare deformity, the entire body then being covered with longer or shorter downy hairs of various colors.

Remarkable instances of universal congenital hirsuties are observed occasionally. The so-called Russian "dog-faced man" (Andrian Jeftichjew) and his son were noteworthy illustrations of this anomaly. In most cases the influence of heredity is distinct and often is accompanied by defective dental development, such as entire absence of molar or of canine teeth. This anomaly may be exhibited in generations of one family.

Acquired hirsuties may be partial or universal, much more commonly the former. Thus, the hairs of the scalp or the beard may acquire an enormous vigor and length, reaching to the ground when the body is in the erect position; or the hypertrophy of the hairs may affect the face of the child or the woman; and in the latter either the upper lip, chin, cheeks, or all portions of the body usually covered by hairs in man may be provided with a vigorous and symmetrically developed pilary growth.

In all cases of hypertrichosis, whether congenital or acquired, the parts normally unprovided with hair are not the seat of the pilosis. The hairy regions in these cases may be provided with a few or many follicles, each of which is the seat of two, three, or even more filaments.

As the growth of the beard in man is more or less associated with the maturity of the sexual organs, so the hypertrichosis of women and children is at times related to a precocious, perverted, or arrested function of the generative organs. The reported instances of menstruation in female infants and children usually include a description of abnormal pilary development about prematurely developed pudenda; and after the climacteric period, when some women in external appearance begin to resemble conspicuously individuals of the opposite sex, either isolated, bristle-like hairs develop over the chin or lips, or the extreme hirsute condition may be reached. Duh-

ring¹ reported one such case, which is illustrated by a lithograph representing the face of a woman provided with a superb beard.

The influence of the sexual organs in the hypertrichosis of women is well demonstrated in the following case described by Dr. Hyde:² A married woman, thirty-three years of age, weighing one hundred and fifty pounds, mother of three healthy children, applied for relief of a general and facial hirsuties, which had resulted in the growth of a full beard and moustache. She had not menstruated for more than a year, and had been pronounced by an expert to be past the climacteric. During 1884 and 1885 the hairs of the face were removed in successive operations by the electrolytic method described below. While under treatment menstruation began and continued thereafter irregularly, at times with intense pain and even menorrhagia. In 1886, after the last of the operations on the face, she rather suddenly lost in weight, decreasing to one hundred pounds, and began to menstruate regularly and painlessly. The hypertrichosis then spontaneously disappeared. A similar case treated by Gottheil and Jackson is recorded by the former.³

Halbau⁴ has described *Hypertrichosis graviditatis* as a symptom of pregnancy.

As a result of the persistent application of stimulating liniments over a region of the body (scapula, sacrum, sciatic notch,), as also after traumatism by pressure or otherwise, a growth of long and numerous hairs is often produced.

In cases of hypertrichosis the hairs may be colored variously, and the hypertrophy of downy hairs be purely numerical, or result in increase in the actual size of the shaft of the individual filaments. In neither case do the hairs present any anatomical peculiarities of structure. The localized congenital form of hirsuties is often characteristic of certain moles, known as *Nevi pilosi*. The surface of pigmented moles (*Nevi pigmentosi*) is often very extensively covered with hairs of a dark color. Singular anomalies have been figured in which extensive regions (one or several limbs, the entire back, even the greater part of the body) were the seat of enormous pigmented moles, covered with warts, fibromata, and other benign tumors, and clothed with a thick covering of longer or shorter hairs.⁵ All such cases exhibit a striking development in either symmetrically or asymmetrically disposed areas of distribution of cutaneous nerves.

Hypertrichosis Neurotica.—The hypertrichosis neurotica of authors is that condition in which an excessive growth of hair has succeeded spinal paralysis and other morbid conditions of the nervous centres.

Trichiasis is that condition in which the eyelashes, diverted from the normal line of projection, are turned inward so as to irritate or

¹ Arch. of Derm., 1877, iii, p. 193.

² Treatise Skin Diseases, 2d ed., 1888, p. 399.

³ Trans. IX Internat. Med. Cong., 1887, iv, p. 180.

⁴ Wien. klin. Wochenschr., 1906, p. 6.

⁵ See Dr. Hyde's case of nevus lipomatodes in a child, the pilary growth being at that age undeveloped (Jour. Cut. Dis., 1885, iii, p. 193).

wound the conjunctival membrane. In *distichiasis* a double row of filaments can be recognized, which are liable to induce similar ocular distress.

Etiology.—The causes of hypertrichosis are obscure. Whatever determines the blood in excess to any region of the body supplied with hair-follicles may be indirectly the cause of hypertrophy of hair, a fact demonstrated in patients who, after applying sinapisms or liniments for years to the skin over the seat of a rebellious neuralgia, exhibit in this region an abundant growth of hair, often several inches in length. In women, whose sex renders the anomaly most disfiguring and distressing, it is noted, as has been observed, in precocious, perverted, or arrested activity of the sexual function. It may be a racial peculiarity, a family trait, an inherited anomaly, or an epiphenomenon in dwarfs, monsters, individuals affected with club-foot, insanity, and congenital deformities of several kinds. The neurotic conditions accompanying certain varieties of hirsuties may be inappreciable; or evidently be due to traumatism; or be exhibited in paralyses or muscular atrophy.

Treatment.—To Hardaway, of St. Louis, belongs the credit for the popularization of the method of removing superfluous hairs by electrolysis, first devised by Michel, of his city. Extensive pilary growths are now often removed by this method without subsequent reproduction of the hairs. A fine needle is introduced into the hair-follicle and gently passed down to the papilla at its base. This instrument is connected with the negative pole of a galvanic battery containing six or more elements, the positive pole of which is in connection with a sponge-electrode held by the patient, who is thus enabled to make or break the circuit at will. When the current is passed, a few minute bubbles of gas escape from the orifice of the follicle, and when the hair-papilla is destroyed the hair itself is readily extracted. The dexterity acquired by practice is requisite for the proper performance of the operation, with a view particularly to the insertion of the needle at the proper angle into the follicle. Few patients complain of pain. The number of hairs removed at a sitting varies with the sensitiveness of the patient's skin. The resulting scar is quite imperceptible or far less disfiguring than the hirsuties, suggesting the appearance of the male beard after shaving. Transitory macules, papules, pustules, and wheals occur at the site of puncture. Care should be taken not to insert the needle too deeply in the particularly vascular regions of the face, as an aneurysmal tumor might be produced as a consequence.

Every detail of this exceedingly simple operation has now been carefully studied and the results, as confirmed by our experience may be given as follows:

1. Any good galvanic battery may be employed. We use habitually a forty-cell stationary battery, the switchboard of which is so arranged that any number of selected cells may be brought into the circuit. A galvanometer should be placed in the circuit indicating a current

of from one-half to four milliampères. The number of cells employed should vary with different individuals, different parts of the face, and on different days with the same individual; *e. g.*, a smaller number is required when a patient previously operated upon returns after a somewhat long period of rest. Two to four cells only may be tolerated over the tip of the nose or the upper lip near the septum nasi. Twelve to twenty may be well borne, after some experimenting, on an insensitive chin.

2. Irido-platinum needles are most useful, though a jeweler's steel broach is preferred by some experienced operators.

3. The needle-holder should be simply a convenient insulated handle, sufficiently long to protect all the points of the operator's right hand from the current, and should be as light as possible, since a heavy holder interferes with delicacy of touch. Duhring's¹ holder, which is of the shape of a thin lead-pencil or pen-holder, is about four inches in length. The handle is of hard rubber, through which passes a metallic rod, acting as a conductor for transmission of the current. The needle is inserted into the needle-holder proper, which is slotted, the needle being clamped immovably by means of a screw-nut. In the other end of the stem is an insulated inserting-pin attached to the cord leading to the battery. The instrument is convenient to handle and altogether well adapted to the operation.

4. The patient should be seated or reclining at ease in a good light, with the handle of the electrode connected with the positive pole of the battery in one hand, ready to press the sponge into the palm of the other. In this way, at the bidding of the operator, the patient makes and breaks the circuit at will. The sponge attached to the holder should be wet with a salt solution.

5. As to further details of the operation, it is well (*a*) to make and break the connection only when the needle is *in situ*, as this diminishes the pain of the operation; (*b*) to introduce the needle with a gentle manipulation (acquired only by skill, and well characterized by Hardaway as a "catheterization" of the hair-follicle), observing a certain degree of parallelism with the hair-shaft as the needle enters; (*c*) to operate leisurely, making sure that the current is not broken by separation of the hands of the patient before the hair is completely free in the follicle (this last can be ascertained by gentle traction on the shaft in from twenty to forty seconds after insertion of the needle); (*d*) to operate in succession upon contiguous hairs when practicable, not selecting one here and one there, the latter course being productive of greater pain; (*e*) never to use the positive pole in connection with a steel needle, an error which results in the production of unsightly pigmented blemishes on the surface of the skin.

The previous employment of preparations of cocain both hypodermically and by inunction (*e. g.*, cocain oleate) to relieve or diminish

¹ Amer. Jour. Med. Sci., 1881, lxxxii, p. 142.

the pain of the operation may be followed by exceedingly unpleasant consequences. A dermatitis thus induced may persist for months.

Prince, of Boston, lays stress upon the accurate regulation of the current by the aid of the absolute galvanometer, which we have found in practice useful but not essential. G. H. Fox¹ reports a gradual decrease in the number of hairs returning after operation proportioned to the improvement in the instruments and the skill of the operator. The percentage of such returns varies with these conditions.

All patients affected with hirsuties are not to be advised the operation. We have declined to operate in many cases which were not deemed to belong to the class in which the best results of the operation may be expected. Young and vigorous women, usually unmarried, may point out hairs to be removed that are merely fully developed filaments of a thick, downy growth, all the hairs of which are rapidly pushing to equal maturity. In these improvement cannot be hoped for and treatment should not be attempted. In most cases, when an operation is undertaken, both parties should fully understand the possible issue. It is a question whether it lies within the legitimate sphere of the physician to remove superfluous hairs from the habitually covered breasts and arms of women. The operation is, however, all that can be desired if only it be performed with sufficient skill and conscientiousness; but if hairs are rapidly plucked away from their follicles while an electric current is merely passing, the return of each filament is prompt. It should, therefore, be understood that it is a procedure requiring ample time on the part of the operator, and either fairly good vision, or eyes aided by a mounted lens. Not more than from forty to sixty hairs can be removed in an hour by an expert operator; and there are few who can work with advantage more than one hour at a sitting, or more than one or at most two hours in a day.

Hairy nevi may be removed by complete excision, but removal of the hairs by electrolysis will sometimes result in disappearance of the entire growth without such operation.

In 1897 Freund² reported that he had succeeded in removing the hairs from a large hairy nevus by using the x-rays. The method was developed further by Schiff and Freund,³ and has been employed since by many observers, including Benedikt, Ehrmann, Jutassy, Pusey,⁴ and ourselves.

After many years' observation of patients subjected to radiotherapy for removal of superfluous hair, the author has abandoned its use. While in some cases the result is satisfactory alike to physician and patient, the probability of future telangiectasis is so great as to be prohibitive of its continued employment.

¹ The Use of Electricity in the Removal of Superfluous Hair, etc., Detroit, 1896.

² Wien. med. Wehnschrft., 1897, xlvii, p. 428.

³ Ibid., 1898, xlviii, p. 1058.

⁴ Pusey-Caldwell: The Roentgen Rays in Therapeutics and Diagnosis, Philadelphia, 1903, p. 339 (with bibliography).

Schwenter-Trachsler¹ has treated 252 cases by a new method as follows: After removing the hair, presumably by shaving, the patient is directed to rub into the surface pumice-stone twice daily. This prevents the hair from growing, and if persisted in for a year produces atrophy of the hair-follicle sufficient to produce a permanent result. After six months a rest of four weeks is given, and if any recurrence happens the treatment is resumed. The skin itself is never injured.

Depilatories for the removal of superfluous hairs operate by the destruction of the filament without obliteration of the papilla. The consequence is that the hairs are reproduced in the course of about a fortnight. Most of the compounds used for this purpose contain either calcium sulphate, arsenic sulphate, or barium sulphid, made into a paste with warm water. This paste is applied over the hairy surface with a spatula, and is permitted to remain until it dries, or produces a sensation of heat or burning, a period usually requiring ten minutes. It is then rapidly removed by scraping with a spatula, when the surface is thoroughly cleansed with warm water, after which the skin is anointed with cold-cream salve or other similar unguent.

Of these depilatories Duhring recommends the following:

R—Barii sulphidi,	3ij;	8	M.
Pulv. zinc. oxid.,			
Pulv. amyl.,	āā 3iij;	āā 12	

To be prepared in form of an impalpable powder, which, just before using, is to be mixed with water to form a thin paste.

The following are formulæ devised by French authors:

R—Sodii hyposulphit.,	3iij;	12	M.
Calcis,			
Amyli pulv.,	āā 3x;	āā 40	

To be finely triturated, and, when used, to be made in a thin paste with water. (Boudet.)

R—Calcis,	3j;	4	M.
Sodii carbon.,	3jss;	6	
Cerati. Adipis,	3i;	30	

To be applied as a depilatory in the manner of a paste.

All these formulæ require caution in their use, and they should rarely be intrusted to patients themselves.

Shaving may be practised upon the hirsute face of women and also epilation; the latter particularly in cases of hypertrophy of the hair limited in extent. Partial success has attended the thrusting into the follicles of needles previously dipped in caustic solutions, or heated in various degrees, but these methods are inferior to electrolytic destruction of the hair-papillæ. The hairs may be rendered less conspicuous by bleaching them with frequent applications of hydrogen peroxid. Bulkley states that a thorough use of this remedy retards the growth of fine hairs.

¹ Archiv, 1912, cxi, p. 69; abstr. Jour. Cut. Dis., 1912, xxx, p. 364.

Plica Polonica.—This was formerly supposed to be a disease peculiar to Poles (whence its name), but which has long been recognized as a result merely of persistent neglect, filth, the invasion by parasites, and consequent exudative disorders of the scalp. When it exists the hairs form a huge, matted mass on the crown of the head. Hebra devotes an interesting chapter to the superstitious awe with which this accumulation of hairs, lice, and filth has been regarded. The same condition has been recognized in Alaska in a number of cases observed among the natives of that region.

Plica Neuropathica.—This term is applied to cases in which there occur tangled "lumps" and "festoons" of hairs, flat, curled, looped, and intertwined, appearing in localized areas of the scalp. Such cases have been recorded by LePage,¹ Stelwagon,² and a few others. In Stelwagon's case the felting hair was limited to a dollar-sized area situated below the occipital protuberance, and formed a rounded, matted, felted lock four feet long. The remainder of the hairs exhibited no tendency to felting.

The etiology of these cases is not known. In LePage's case neuralgic pains had occurred previously in the site of the growth.

ATROPHIA PILORUM PROPRIA.

Synonym.—Atrophy of the Hair.

Definition.—Atrophy of the hair may be either symptomatic or idiopathic. Illustrations of the first-named condition are observed in phthisis, syphilis, seborrhea, parasitic affections of the scalp, and in almost all general diseases interfering with the nutrition of the pilary growth. The filaments then become dry, lustreless, friable in both longitudinal and transverse directions, and diminished in each dimension. Three forms of atrophy are recognized: *Fragilitas crinium*, *Trichorrhexis nodosa*, and *Monilethrix*.

Fragilitas Crinium.—Under this title a number of disorders due to atrophy, and which produce fragility, splitting, or curling of the hair in abnormal directions, have been described by authors. In a number of local diseases, such as ringworm, favus, and dermatitis seborrhoica, the nutrition of the hairs may be interfered with to such a degree that they lose their lustre and become dry, brittle, and broken. A similar condition exists in certain constitutional disorders, such as tuberculosis, certain fevers, and other cachectic disorders, which lower the general vitality. In all these cases splitting of the shafts of long hairs is not uncommon, and atrophic changes with respect to size and coloration of the hairs occur. In idiopathic examples of the disorder, such as those reported by Duhring,³ Hyde,⁴ and Parker,⁵ marked splitting of the hairs occurs in various ways. Duhring describes fission taking place within the follicle, thereby producing irritation of the skin in that

¹ Brit. Med. Jour., 1884, i, p. 160.

² Ibid., July, 1878.

³ Brit. Med. Jour., 1888, ii, p. 1335.

⁴ Amer. Jour. Med. Sci., December, 1892.

⁵ Treatise on Skin Dis., 2d ed., 1888, p. 441.

situation; and further describes an atrophy of the bulb and the separation of the hair-shaft into a variable number of stalks, the shaft often becoming enlarged. The curious feature, to him, was the atrophy of the bulb and the apparent hypertrophy of the shaft. In 1887 Dr. Hyde described a similar case, presenting fission of the hair of the beard extending completely to the base of the hair-follicle and there producing irritation. The involved hairs covered several square inches of the surface. The disease was more marked on the chin than on the cheeks or upper lip. Curling of some of the splinters was marked. Similar features were described in Parker's case. When the splitting of the hairs exists solely at the free margins or in the shaft, the condition is quite different from that described above.

Two cases presenting peculiar features were recorded by Jackson.¹ In these there occurred in the scalp well-defined patches where the hair was short and curled up close to the head. There was no sign of inflammation. In a case exhibiting short stumps of hair in a patch the size of a silver dollar, exhibited before the American Dermatological Association by the author in 1914, Dr. Jackson recognized the same condition. In this case the hair in the patch was curled and of finer texture than the rest, and in addition there was intense itching in the area.

The cause of the systemic cases above described is plain; that of the idiopathic cases is not understood. Kaposi believed the splitting occurring in the long hairs in women was due to its distance from the source of nutrition. The splitting of the shaft of long hairs in women without involvement of the point is often due to the thrusting of sharply pointed hairpins through the hair-coils on the scalp, a single thrust being thus capable of ruining a large number of hairs in a braid (Hyde). Jackson² believes that the drying of hair with blasts of hot air, as is done by some hairdressers, is responsible for some cases, as well as the use of hot curling-irons, and neglect of proper oiling of the scalp after washing.

Treatment.—The treatment of these conditions is primarily hygienic, as regards both the general health of the patient and the preservation of the hair from artificial methods of management (hot irons, curling, singeing, crimping, and wounding with hairpins). When associated with local or systemic disease, the latter should receive prompt treatment. In addition, local stimulation, shampoos, and inunctions with bland oils and simple applications are useful. When the region of the beard is affected, it should be shaved with regularity.

Trichorrhexis Nodosa (*Trichoptilosis* (Devergie), *Nodositas crinium*, *Trichoclasia*, *Clastothrix*).—Trichorrhexis nodosa is a disease of the hairs, first described by Wilson in 1849, since which time it has been the subject of extensive discussion. It occurs chiefly in the male beard. The diseased hairs show one or more, usually several, nodular

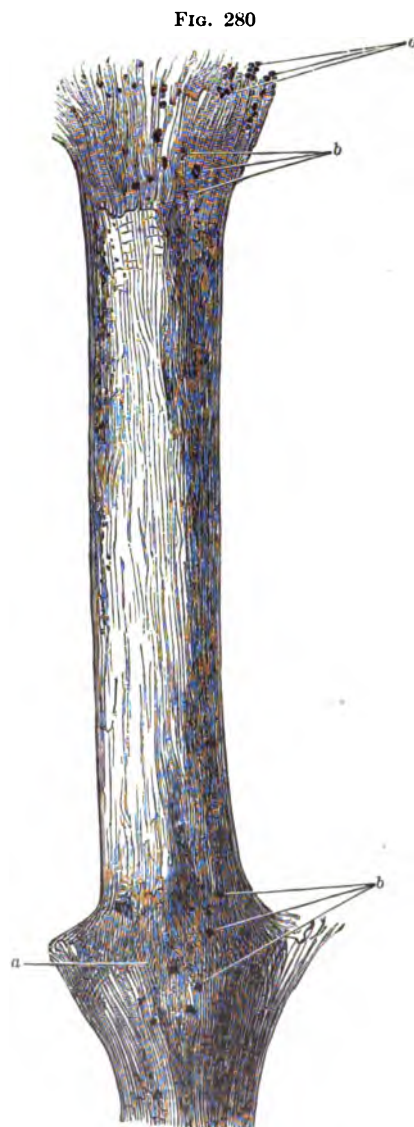
¹ Jour. Cut. Dis., 1903, xxi, p. 473.

² Jackson and McMurtry, Dis. of the Hair, 1912, p. 130.

enlargements, which on careful examination are seen to be due to partial transverse fracture of the hair-shaft. The nodes are oval or ovoid in shape, and stand out fairly prominently, presenting a grayish

or whitish appearance. They frequently resemble quite markedly the ova deposited by the *Pediculus capitis*. Under the microscope, the nodes are seen to be composed of a fracture of the hair, which presents somewhat the appearance of two interlocking brushes. When the hair is completely broken, its end simply presents a brush-like appearance. The brittleness of the hair, with consequent fracture and loss, produces a certain amount of alopecia.

Etiology and Pathology.—The chief causes of the disorder are given as mechanical and parasitic. Wilson believed the nodes were the result of mechanical injury to a hair whose nutrition was below par. Adamson¹ produced typical nodes by trauma in hairs from a patient suffering with the disease. Similar experiments were made with normal hairs as control without producing the same result. He concludes that the fractures or nodes are the result of mechanical injury to a hair of damaged nutrition. Hodara² found a bacillus, which he termed *Bacillus multiforme*, that he cultivated, and with which he reproduced the affection by inoculation. Spiegler (quoted by Adamson) described a similar bacillus, which he believed to be identical. He also reported successful inoculations. Markusfeld³ rubbed up hair with pumice-



Trichorrhexis nodosa. (After Schwimmer.)

stone in a sterilized mortar and obtained a Gram-positive bacillus which he identified as being the same as Spiegler's. Heidings-

¹ Brit. Jour. Derm., 1907, xix, p. 99.

² Archiv, Bd. xlviii, p. 146.

³ Monatshefte, 1894, Bd. xix, p. 173.

feld¹ believes there are two varieties, a pseudo and a true, the latter being of infrequent occurrence. Bruhns² found trichorrhexis nodosa common in Berne. In a study of 20 cases, in 6 of which inoculation experiments were made, the latter proved negative. He believes in the mechanical cause in hairs having an underlying nutritional change, and quotes Rauber's case, in which the disorder occurred periodically following epileptic fits. Richter³ concludes the disease is not parasitic, but due to interference with the nutrition of the hair. Barlow,⁴ after reviewing the bacteriological investigations of Raymond, Blaschko, Hodara, Spiegler, and Essen and comparing them with his own results, concludes that there is no absolute proof that the condition has a parasitic

FIG. 281



Trichorrhexis moniliformis. (Heidingsfeld.)

origin. He further states that the view that trichorrhexis nodosa is conveyed from diseased hairs to the bristles of brushes cannot be accepted, for the reason that the same condition is found in brushes which have not been in contact with diseased hairs. The mechanical origin of the disease must be considered. Observation shows that the condition is only found in much-used brushes and not in new ones; and, finally, it is probable that nutrition-changes in the hair play a

¹ Jour. Cut. Dis., 1905, xxiii, p. 246 (a report of a case and review of the literature, with extensive bibliography; illustrated with 6 plates).

² Archiv, 1897, xxxviii, p. 43; abstr. Brit. Jour. Derm., 1897, ix, p. 290.

³ Münch. med. Wochenschr., No. 40, October 6, 1896, p. 947; abstr. Brit. Jour. Derm., 1897, ix, p. 121.

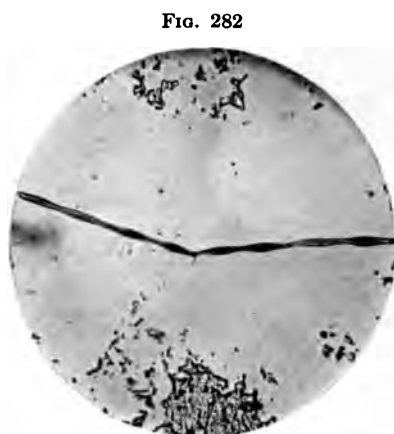
⁴ Münch. med. Wochenschr., No. 26, June 30, 1896, p. 615; abstr. Brit. Jour. Derm., 1897, ix, p. 121.

part in the production of the disease. Stelwagon¹ and Ravenel² found the disease in the bristles of shaving-brushes used by patients with the disease. The supposition was that the brushes were infected by the patients. Similar observations were later made by several other observers. By some of the later investigators the disease was not only found in brushes used by patients having the disorder, but in those used by unaffected individuals.

Treatment.—Treatment is unsatisfactory. Crocker states that change of climate has cured it in some cases, and that repeated shaving is sometimes successful in others. Richter advises the use of oils and simple ointments and an avoidance of all mechanical irritation. Those who view the disease as parasitic suggest parasiticides. The extraction of the affected hairs is recommended by most observers. General treatment in the way of tonics may be of value in certain

cases, but the experience of all, no matter what their view as to etiology, points to the fact that treatment is, as a rule, disappointing.

Monilethrix³ (*Beaded hairs, Pili annulati*. Ger., *Ringel haaren*; Fr., *Aplasie moniliforme intermittente*).—Monilethrix is a rare condition, first observed by Walter Smith, of Dublin, in 1879, and since by a number of others, including Luce, Anderson, Crocker, Lesser, Behrend, and Gilchrist. The disease, as a rule, occurs in children, but may begin later in life. Cases occurring in adults have been recorded by



Trichorrhexis nodosa. (Heidingsfeld.)

Unna, Gilchrist, Morrow,⁴ Ruggles,⁵ Savatard,⁶ and others. The scalp exhibits a moderate amount of alopecia, showing broken stumps of hairs, and very frequently there is a concomitant keratosis pilaris. Brocq⁷ believes the two disorders are closely related. The hairs are peculiar in exhibiting along the shaft a succession of rings or nodes, between which are narrower portions of the shaft of a lighter color than the pigmented nodes or thicker portions. The result is a characteristic checkered or beaded appearance of the hairs. Fracture always occurs between the nodes, the fractured extremity being as a rule clean; a brush-like stump, however, has been recorded in some cases. As a rule, the disorder is limited to

¹ Quoted in Stelwagon's *Diseases of the Skin*, 1914, p. 976.

² *Medical News*, October 29, 1892.

³ For full bibliography to date of publication of his paper, see Gilchrist's article on Monilethrix, *Jour. Cut. Dis.*, 1898, xvi, p. 157.

⁴ *Jour. Cut. Dis.*, 1899, xvii, p. 41.

⁵ *Brit. Jour. Derm.*, 1912, xxiv, p. 319.

⁶ *Ibid.*, 1900, xviii, p. 500.

⁷ *La Pratique Derm.*, i, p. 362.

the scalp, particularly the posterior portion. In a few cases, other portions of the body have been invaded. Ruggles recorded a case of symmetrical involvement of the legs below the knees. Gilchrist's case was also upon the legs.

Etiology and Pathology.—The cause of the disease is undetermined, but a number of factors may be considered. The disease begins, as a rule, in childhood, though adult cases are recorded. The sexes are about equally attacked. Nervous shock is given by Unna and Sabouraud as a probable cause. Heredity is a factor in the causation of the disorder. Fourteen cases in five generations were recorded by McCall Anderson; seventeen cases in five generations by Sabouraud; five cases in two generations by Hallopeau and Lefèvre. Dore¹ recorded two cases in one family, no other hereditary history being present in the latter two cases. Kaposi, Virchow, and others explained the peculiar condition of the hair as being due to a periodic aplasia of the hair-follicle. Smith believes the disorder to be due to perverted nutrition, in which there are alternate periods of activity and sluggishness, and that the origin of the disorder is intrafollicular. Gilchrist found the disorder had its origin in the hair-follicle near the papilla, and further found strictures in the follicle corresponding to those on the hair. The region of the corium around the follicle showed marked chronic pathological changes. Bacteriological examinations have been uniformly negative. Gilchrist concludes that the disorder is possibly one of trophoneurotic origin.

Treatment.—The treatment is directed toward the general and local improvement of nutrition. Very little has been accomplished with treatment in cases in the past. One patient recovered spontaneously. Crocker recommends stimulation of the scalp with a faradic brush.

TRICHONODOSIS.

Synonym.—Knotting Hair.

A patient presenting this peculiarity was demonstrated before the London Dermatological Society in 1905 by MacLeod.² In 1906 Galewsky³ recorded cases under the above title, in which there was exhibited a pseudo-knotting and fraying of the hair, associated with thinning and breaking of the hair-shaft, so that it remained short without cutting. It was further stated that the long hairs of the scalp, beard, pubes, and even the lanugo-hairs of the trunk, might be involved. MacLeod⁴ describes a case in which the scalp was dry, the hairs dry and lustreless, but deeply pigmented, and the ends split up into several fibers, or pointed and atrophic, or occasionally bent up like a hook. The majority were curled up at the ends, forming one or more loops. In cross-section the hairs were seen to be flat or oval, some twisted. Many small nodes were present, but not all the

¹ Brit. Jour. Derm., 1910, xxii, p. 164; and *ibid.*, 1911, xxiii, p. 111.

² *Ibid.*, 1905, xvii, p. 61.

³ Archiv, 1906, lxxxi, p. 195.

⁴ Brit. Jour. Derm., 1907, xix, p. 40.

hairs were involved; some had several nodes, usually on the peripheral half of the shaft. On microscopic examination the nodes proved to be various forms of knots. Kren,¹ in examining 54 women with skin disease, found 35 had nodes on the hair, the site of the node being near the middle or terminal portion of the hair.

Dawson² recorded a case of fragilitas crinium associated with knotting. In this patient the hairs were breaking off close to the scalp, and on some of them nodular swellings occurred, which on microscopic examination proved to be half-hitched knots, situated about two inches from the roots.

PIEDRA.³

Synonyms.—Fr., Trichomycose Nodulaire.

Definition.—Piedra (Sp., *piedra*, a stone) is a name given to a disorder affecting chiefly the natives of certain districts in Colombia, South America. Both men and women (more frequently the latter) and persons of all races are liable to contract the disease, which involves the shaft of the hairs of the scalp chiefly, but also of the head and other hairy regions. The individual filaments are dotted at irregularly disposed points with minute nodosities, apparently as hard as stone, from which circumstance the disease has acquired its Spanish name. The nodes are pinhead-sized and gritty, so small at times as to be scarcely perceptible to the eye, though distinctly recognized on palpation. A score or more have been found on a single hair 60 centimetres in length. The affected filaments are distorted, and apt to be matted and twisted, as in plica. Each node is fastened to the hair like a sheath, though it may be implanted on one side only. It is divided readily with a sharp knife; and is colored in various shades of gray, brown or black. When a comb is passed through the hairs, a distinct crepitation is produced by friction against the dense, nit-like nodes.

MacLeod⁴ describes specimens of hair from an aboriginal Indian girl, British Guiana, as follows: The hairs were characterized by the presence on the shaft of hard nodules, varying in size from minute specks like particles of grit to small pinheads, oval in shape, brownish black in color, situated either on the side of the shaft, like a nit, or forming a concretion around it. The extrafollicular portion only was affected. The nodules varied in number from one to ten or more, and were situated close to each other or at irregular intervals. They were entirely outside of the hair-shaft at first, but eventually caused a breaking up of the cuticle and fraying of the cortex, and rendered the hair liable to fracture opposite them.

¹ Wien. klin. Wochenschr., 1907, p. 916; abstr. Jour. Cut. Dis., 1908, xxvi, p. 438.

² Brit. Jour. Derm., 1909, xxi, p. 54.

³ Manson, Loc. cit., p. 780. Morris, London Pathological Society's Trans., 1879, p. 441 (with plate), and Medical Times and Gazette, 1879. Juhel-Rénoy, Annales, 1888, s. ii, ix, p. 777, and 1890, s. iii, p. 765 (with illustrations). Trachsler, Monatshefte, 1896, xxii, p. 1.

⁴ Brit. Jour. Derm., 1911, xxiii, p. 255.

Etiology and Pathology.—The origin of the disease is unknown, but in Colombia it is said that the node-like masses are due primarily to a species of mucilaginous oil employed by the natives for hair-dressing. According to Juhel-Rénay, the nodes are composed of numerous spore-like bodies, recognized readily by soaking the hairs in dilute liquor potassæ after washing in ether. The spores are twice the size of those furnished by the trichophyton, are polyhedral as a result of counter-pressure, and form a species of tessellated mosaic, the elements of which are united by a greenish, soluble cement, in which are incorporated minute rods resembling bacteria.

In MacLeod's case he states that the nodules were seen to consist of large spores of a peculiar fungus, which were probably those described by Behrend as *Trichosporum giganteum*. In small nodules the spores had a strikingly regular arrangement. At the periphery of the nodule there was a palisade layer of oblique spores of from ten to twelve microns in length, arranged at right angles to the hair-shaft; while next to the hair the spores were irregular and tended to be polygonal. In some instances they had a peculiar fan-like arrangement of rows of spores radiating from a central base. They appeared to be held together in a mass with some cement substance, which formed a sort of capsule enclosing them; and they presented a yellowish appearance, due to a diffuse coloring matter in the protoplasm and the presence of pigment-granules. No definite mycelium threads were seen.

Cultures from this case are described by MacLeod¹ as follows: The culture began as a small, white knob, with a slightly woolly surface. It gradually changed, and in a week assumed a greenish-gray tint, and finally became of a brownish tinge, a little lighter than cooking chocolate.

Diagnosis.—The disease is closely allied to tinea nodosa (Crocker and Pernet) and to Piedra nostras (Unna and Behrend), but is quite distinct from lepothrix and Castellani's trichomycosis flava, nigra, and rubra, both of which affect the axillary regions chiefly.

Treatment.—Thorough cleansing with soap and water, followed by the application of a parasiticide, is recommended, with shaving if necessary.

Chignon Fungus (*Beigel's disease*).—This affection is discovered upon false hairs, which exhibit upon their shafts dirty-brownish nodes, due to masses of parasites. These organisms are said by Hallier² to be a species of sclerotium.

Piedra Nostras (Unna); *Tinea nodosa* (Crocker).—This disease was first described by Morris and Cheadle,³ and has since been reported by Crocker,⁴ Thin,⁵ and others. The disorder affects the hairs of the beard or moustache. The nodular concretions are developed irregularly along the hair-shaft, the bulb remaining unaffected, as the concretions

¹ Brit. Jour. Derm., 1912, xxiv, p. 23.

² Quoted from Jackson and McMurtry, Dis. of the Hair, 1912, p. 291.

³ Lancet, 1879, i, p. 190.

⁴ Dis. of the Skin, 3d ed., p. 1176.

⁵ Lancet, 1882, ii, p. 742.

begin some distance from the root. Crocker described the hairs as being ensheathed in a concretion which made the outline of the hair irregular and of a dark-brown color, dull and opaque. The hairs are brittle and break or split. Under the microscope the growth is recognized as an ensheathing mass, which, when the hairs are split, penetrates below the cuticle. With high power it is seen to be made up of fungus spores, somewhat smaller than those occurring in trichophytosis. In Crocker's case Pernet found the spores occurring in rows at right angles to the shaft of the hair, looking like segmented mycelium, and bound together by a cement substance secreted by the fungus.

Treatment.—The treatment advised is shaving or clipping, with the application of parasitocides.

TRICHOMYCOSIS FLAVA, NIGRA, AND RUBRA OF AXILLARY REGIONS.

Castellani¹ under this title has described a condition involving the hair of the axilla, found in the hot, damp districts of Ceylon, somewhat resembling the lepothrix of temperate zones. In these cases the hair presents formations, plainly visible to the naked eye, of rather soft consistency, yellow or black, or, rarely, red in color. They may be abundant and form a yellow, black, or red sheath around the hair. Two varieties may coexist, usually the yellow and the black. In one patient, all of the hair of the right axilla was affected with a yellow variety, and that of the left with a black. A combination of two varieties may also be seen in individual hairs.

On microscopic examination with low power, the affected hair is seen to be covered in several places with roundish formations, partially or totally encircling the hair. With higher magnification, there may be seen enormous numbers of bacillary-like bodies in the yellow variety, while in the black and red varieties there occur in addition to these organisms masses of cocci-like organisms. Castellani believes that the yellow variety is due to a bacillary-like fungus, *Nocardia tenuis*, and that the black and red varieties are due to a symbiosis of this fungus with chromogenic cocci: a coccus producing black pigment (*Micrococcus nigrescens*) in the black variety, and a coccus producing red pigment in the red variety. The black pigment-producing coccus is readily cultivated.

The course of the disease is chronic, but the condition may subside or disappear on removal to a cold climate. The treatment suggested by Castellani consists in the local application of a solution of formaldehyd, 1 drachm (4.) in spirits 6 ounces (180.), two or three times daily, and a 2 to 5 per cent. sulphur ointment before retiring at night.

¹ Brit. Jour. Derm., 1911, xxiii, p. 342; and Castellani and Chalmers' *Manual of Tropical Medicine*, 2d ed., 1913, p. 1521.

LEPOTHRIX.

Synonyms.—Trichomycosis Nodosa (Patterson), Trichomycosis Palmellina (Pick).

Definition.—This disorder, first described in 1869 by Paxton,¹ and since recognized by Patterson, Pick, Babès, Barthélemy, and others, affects the hairs chiefly of the axillæ and the genital regions. The hairs are dry, brittle, roughened, and loosened in their follicles. Under the microscope, the shaft is seen to be either for a great part or for the entire length ensheathed in a concretion which may here and there be interrupted by furrows—a diffuse form of the affection. In a nodose form there are irregularly placed spherical masses, isolated, and more numerous toward the point than near the implanted extremity of the shaft. Crocker describes also circular and well-defined masses lying upon but not surrounding the shaft, three times the diameter of the shaft, and containing fibers of the cortex that have been split by the concretion. The fracture may be clean or be brush-shaped. The nodular masses are firm, gluey, well attached to the shaft, and reddish-brown to blackish in shade. At times they are reddish, due to the micrococci which produce red sweat.

The nodes are found to be made up of chains of spherical or of elliptical micrococci, which penetrate the cortical layers of the hair with ease in regions of considerable moisture and sweat. The micro-organisms at first obtain access by minute separations of the cuticle of the hair, and they eventually penetrate more deeply, breaking up the cortical portions. While thus multiplying, a homogeneous substance, similar to the chitin by which the louse fastens its eggs to the hair, forms the bulk of the concretion in which the colonies of cocci are lodged.

Treatment.—The treatment recommended by Crocker is by shaving and external applications of mercuric chlorid (1 to 2000).

TRICHOSTASIS SPINULOSA.

Under the above title Nobl² described a peculiar condition involving the hair-follicles, which apparently had not been recorded, but which he believed was not very rare, as he had discovered six cases in the course of a few months in his clinic. The disorder occurred in patients between the ages of twenty-four and sixty-two, and five of the six were men. In one of these the lesions were described as appearing like dark comedo-plugs seated in the hair-follicles on the shoulders, back, at the sides of the thorax, and on the upper abdomen. They were symmetrically placed, raised from 1 to 1½ mm. above the surface, and were unaccompanied by any evidence of inflammation. On microscopical examination, the lesions were found to be bundles of hairs, each being 1½ to 2 mm. in length, and containing from ten

¹ Jour. Cut. Med., 1869, iii, p. 133.

² Archiv, 1913, cxiv, p. 611.

to forty hairs. There was no evidence of inflammation in the corium, and the author looked upon the condition as being a congenital dystrophic disturbance of hair-growth in the individual follicle.

CANITIES.

Synonyms.—Trichonosis Cana, Poliothrix, Poliosis, Hoariness. Grayness or Whiteness of the Hair.

Symptoms.—In this anomaly the hairs appear in all shades of whiteness, from dirty-gray or yellowish-white to a steel-gray or silvery-white. This may be either a general or a partial, congenital or acquired, physiological or pathological, prematurely, rapidly, or gradually acquired condition. General congenital whiteness of the hairs is seen in albinismus, where pigment has never colored the filaments. Partial congenital whiteness is occasionally seen in patches, limited in size and varying in color from pure white to a deeper hue, that from birth do not receive pigment in due proportion, thus contrasting with the pigmented filaments by which they are surrounded. This is sometimes a family peculiarity.

Physiological decoloration of the hairs in variable shades is the well-known result of advancing years. When premature, it may occur early in life and result from pathological causes or be due to individual or inherited peculiarities. It may occur gradually or suddenly; in the former case the hairs usually pass through varying shades of gray to white, and this at any period after (occasionally before) puberty, though commonly after middle life is reached. At first a few scattered hairs are bleached; then these multiply, and so gradually the whitening occurs; in other instances the bleaching is general, symmetrical, and uniform. In yet other cases, even in senile hoariness, the canities is at first circumscribed, the hairs of one part of the scalp blanching before others; thus the hairs of the beard whiten before the scalp, or *vice versa*. Recurrence to the darker shades is noted rarely. Leonard,¹ of Detroit, cites a number of curious instances in which changes of this sort have occurred. Generally, however, canities of advanced years is progressive and permanent, occurring earliest on the temples and the beard of man, then involving the vertex of the head. Finally, the hairs of the entire body-surface may undergo similar pigmentary loss.

The coloring of the hairs of the head is, to a greater extent than commonly is appreciated, subject to variation from the operation of external causes. Thus, washing the hair with alkaline solutions has a bleaching effect, while profuse sweating, inunction with fats, subjection to smoke, and the heat of summer have the opposite effect, the last named being associated possibly with increased sweating in the hot season.

¹ The Hair: its Growth, Care, Diseases, and Treatment, Detroit, 1880.

Cases of sudden blanching of the hairs, occurring, for example, in a single night, are sufficiently numerous and well authenticated to be admitted as among the rare possibilities of a clinical experience. Nervous disorders, both centric and peripheral, such as long-continued mental depression, melancholia, paralysis, neuralgia, and traumatism of nerves or of nervous centres, may be followed by more or less rapid, general or partial, and permanent canities. The same result may follow wasting disorders, such as typhoid fever, tuberculosis, syphilis, and malarial fever, in which cases, as distinguished from the others, pigmented hairs eventually may replace those which were white. A peculiar case of canities in a child¹ was observed by the author, in which the hair was of an iron-gray hue, due to admixture of a few brown hairs with the white. At three and one-half years the patient had had complete defluvium capillorum following typhoid. The hair promptly regrew and presented the appearance described when the child was seen at the age of five years (Fig. 283). At this time the hairs of the brows and lashes were entirely white, and there were associated vitiliginous areas in different parts of the body. The general health and nutrition otherwise were perfect.

The first hairs springing from a patch of alopecia areata in which repair is in progress are often white or gray, and are replaced later by those of normal color. The pressure of a truss or of a corset has produced patches of vitiligo and canities.

Landois has shown that many instances of suddenly occurring canities depend solely upon the rapid appearance of air-bubbles in excess of the average number in the hair-shaft.

In the rare affection known as *Ringed hair* the pilary shafts present alternately white and pigmented segments.

Etiology.—Whitening of the hair may be senile in origin, in which case it is customary to declare it to be physiological; or be due to heredity; to deficient nutrition or innervation of the hair-follicles; to functional or organic nervous affections (fright, facial atrophy); or to local chemical action upon the hairs. Premature canities in young adults is often associated with the occupations of life, being much commoner in men who from necessity have the head habitually covered and who yet lead sedentary lives.

FIG. 283



Iron-gray hair.

¹ Jour. Cut. Dis., 1909, xxvii, p. 258.

Pathology.—The color of the hair is dependent upon the pigment situated in the matrix and between the horny cells, and upon the natural yellowish color of the dried horny cells. In source and character the hair-pigment is undoubtedly identical with that of the skin in general. Decoloration of the hairs may be due to failure of supply or to removal of pigment; to unevenness of the hair-surface (by which light is refracted); or to air-bubbles between the cells. In senile and presenile decolorations there is commonly actual diminution of pigment. Rapidly occurring canities is ascribed to the sudden appearance of air-bubbles in quantity in the shafts of the hair. Alterations of color in the hairs are attributed to successive periods of activity and rest in the pigment-producing cells.

Treatment.—The chief means of remedying premature canities is by the action of dyes, which are, in the main, compounded with solutions of silver nitrate, lead acetate, and ferrous sulphate. The main objections to their use are the fact that the dyed hair never has the exact hue and lustre of naturally tinted filaments, and thus rarely deceives the observer, and the disagreeable coloring of the scalp which results from incautious use of the dye, and the consequent liability to irritation of the surface. These substances are not known to have a deleterious effect upon the general health. Kaposi gives the following formulæ for hair-dyes:

To obtain a black color—

R—Argent. nitrat.,	gr. xv;	1	5	M.
Ammon. carb.,	gr. xxij;	1		
Unguent.,	ʒj;	30		

Or

R—Argent. nitrat.,	ʒj;	4	ad	90	1	M.
Plumb. acetat.,	gr. xv;	1				
Aq. ros.,	ad fʒiij;	ad				
Aq. cologn.,	gtt. xv;	1				

To obtain a brown shade—

R—Acid. pyrogal.,	gr. xv;	1	45	M.
Aq. cologn.,	ʒss;	2		
Aq. ros.,	ʒjss;	45		

Anderson first applies a lotion of mercuric chlorid, 2 grains to the ounce (0.133 to 30.), and follows this with a solution of sodium hyposulphite, 1 drachm to the ounce (4. to 30.), for the production of a jet-black shade. In the way of constitutional treatment, he suggests, in cases of accidental presenile blanching, strict attention to the general health and arsenic internally.

ALOPECIA.

Synonyms.—Calvities, Defluvium Capillorum, Deficiency of Hair, Baldness. Fr., Alopecie; Ger., Kahlheit.

Definition.—The term “alopecia” denotes loss of hair. It occurs in a large number of morbid conditions. For convenience of description, the various varieties of this loss are classed under the general term alopecia, then divided into the sub-groups of congenital, premature, and senile. Alopecia areata, being distinctly different from the above affections, is considered particularly in these pages.

Alopecia Congenita¹ (*Hypotrichiasis, Alopecia adnata, Oligotrichia congenita, Congenital alopecia areata, Universal congenital atrichia. Fr., Alopecie congénitale*).—Under these several titles has been described a group of rare cases in which the symptoms, though possibly originating from different causes, are suggestively similar. The following conditions are described under this title:

FIG. 284



Alopecia congenita.

1. Complete and universal absence of hair at birth, not succeeded later in life by a pilary growth. This is believed to be an intrauterine atrichia due to failure of development of the hair-follicles.

2. Universal congenital hypotrichiasis, in which hairs develop in all regions of the body, but later fail to be succeeded by filaments normal in length, vigor, color, and texture. Two subvarieties of this condition have been recognized: (a) That in which the infant at birth is provided with the relatively long hair of most normal infants, which in due time falls and is replaced by a scanty down, which later does not develop into the normal hair of the adult; (b) that in

¹ For extended discussion of this subject and bibliography, see article by Hyde: “Congenital Alopecia as an Expression of Atavism,” *Jour. Cut. Dis.*, 1909, xxvii, p. 1.

which, after birth, the hair which normally is shed persists, but later there is produced a scanty or ill-developed pilary growth.

3. Complete or partial absence of hair at birth in definitely circumscribed regions, such as the scalp, the brows, the pubes, or the axillæ.

4. Generalized or circumscribed absence of hair at birth, followed in later life by normal hair-development. This condition is believed to be due to preëxisting intrauterine disease, or to such a disease seriously involving the hair-follicles at birth, resulting in a true alopecia, evidences of which may be lacking at the time the patient comes under observation. Some cases of congenital hair-absence are reported as due to alopecia areata from intrauterine nervous shock.

5. Cases in which one or all of the anomalies cited above coexist with anomalous conditions recognized in the teeth, nails, and other organs.

Dubreuilh and Petges¹ describe the condition as occurring upon a portion of the body (chiefly the scalp) where there has been a congenital nevus; in other cases the condition results from arrested development of the skin. In these cases the plaques are situated near the posterior fontanelle, over the occiput, or on or near the median line. These authors also describe an "obstetrical" form, characterized by the irregular and variable outline of the patch, occupying the parietal or fronto-parietal regions, where the forceps of the obstetrician are applied; and a "sutural" form, produced by enlargement of the cranium before union of the bones, its seat coinciding with the lines of union of the cranial bones.

The anomalies thus outlined are rare, the rarest being those in which there is failure of development of the hair-follicles; in this case the condition is congenital, permanent, and complete. The "complete and absolute cases" described by Eshner, Shede, and Ziegler are due either to non-development of the hair-follicles or to intrauterine accident.

In cases commonly recorded under the titles given above, several generations of a single family may be similarly affected; parents and child, grandparents, uncles, cousins and cousins-german, and other near or slightly removed relations of the subject of the anomaly may exhibit both natal and postnatal hypotrichiasis. Nicolle and Halipré report the existence of this anomaly in 36 individuals occurring in six generations.

The teeth and nails are frequently altered in cases of congenital alopecia, the latter probably being more involved. In addition, there may be a defective secretion of sweat, impairment of the senses of smell and taste, and various other physiological defects. Cases are recorded with coincident webbing of the fingers and toes by both Hyde and Winfield (quoted by Hyde). Several of the subjects of the anomalies are reported as victims of alopecia areata, atrophy of the

¹ *Annales*, 1908, s. iv, ix, p. 257 (A valuable contribution to the subject of circumscribed congenital alopecia).

finger-tips, epidermolysis bullosa hereditaria, and xeroderma. Whitish, mosaic-like areas have been recognized in the retina, supposed to be due to retinitis albicans, but, according to Hyde, more probably the result of congenital reversion, the type of some of the lower animals whose retina exhibits areas through which the sclerotic is projected.

Etiology and Pathology.—Congenital alopecia attacks the male subject more frequently than one of the opposite sex. The number of subjects of the male sex is nearly double that of the female sex. In a certain proportion of cases heredity¹ plays a part. No demonstrable cause can be assigned for this condition. The mothers of some of the subjects of this anomaly have suffered from antenatal alopecia areata, and the disorder has been noted in families of close intermarriage.

The condition is probably due to arrested, or entire lack of, development of the hair-follicles. The arrest may occur at any period from the time when, in the embryo, a slight invagination occurs, through all the stages of the future development of the hair and follicle. The follicles may therefore be seen as slight invaginations or minute depressions, when arrested very early. Later this follicle may be more or less completely formed, with its papilla in a corresponding stage of development. Upon the stage at which the process stops will depend the future result—utter, complete absence of the hair, or rudimentary productions of hairs. In certain cases the developmental process is accomplished in varying degrees after birth, and in these cases the hairs may be produced more or less perfectly in later years.

According to the observations of Schede, Atkins, and Ziegler, the sebaceous and sudoriparous glands are normal, and the hair-follicles are represented by epithelial cylinders, composed of five or six layers of cells, with a central lumen, not containing a hair and without a papilla. These cylinders represent hair-sheaths, but are incompetent to produce evolution of a pilary filament. Certain authors, according to Brocq, have found complete absence even of rudimentary follicles.

The process appears, therefore, to be one of defective development, of unknown origin.

Treatment.—The treatment of these conditions is that which is outlined in cases of simple alopecia.

Prognosis.—It is to be remembered that many of these cases are hopeless, the hairs never developing to a normal condition, the nails always remain undeveloped, and in some cases the teeth are permanently deficient in number and size.

Alopecia Prematura.—Premature or presensile alopecia (*premature calvities*) is that form of acquired baldness which occurs in individuals who have not attained advanced years. Idiopathic and symptomatic forms are recognized.

¹ Balzer and Barthélemy, Bull. Soc. fran. Derm., 1914, p. 321. (Congenital Alopecia in a Family.) A report of 4 cases in 3 generations.

Alopecia Prematura Idiopathica.—This is that variety in which diseases of the scalp or of the general economy cannot be recognized as factors in its production. It is, like the senile alopecia, more common in men than in women, and is in the former sex decidedly prevalent among those leading sedentary lives. The loss of hair may be produced either rapidly, or, more commonly, slowly, and at any time after puberty.

The process may begin with slight thinning of the hair in the affected regions. On close examination it becomes clear that the hairs which remain are relatively lustreless and lacking both in vigor and size as compared with the hairs growing on unaffected portions of the scalp. The hair-loss is always symmetrical, and at times remediless, partial alopecia being a permanent result of the process. The pilary growth may recede gradually and evenly from the forehead, or, what is more frequent, from the temples on either side of the median line, leaving a more vigorous crop extending centrally toward the root of the nose; or the loss may produce the effect of the tonsure. Often the fall of individual hairs is followed by a new growth of younger filaments, these rarely developing beyond the grade of short and slender hairs, which either soon disappear or persist without much further development. In many families there is a predisposition to this premature loss of hair, usually in the form of the receding temple, that may be recognized in the males of succeeding generations. At the time that the hair in the situations described above is either gradually or more rapidly disappearing, a growth of strong, active hairs over unaffected regions may be noted. In some persons the baldness, even before the attainment of the middle of the third decade, involves the greater part of the scalp.

Alopecia Prematura Symptomata.—This variety of alopecia may result from a number of systemic and local conditions. Loss of hair (*defluvium capillorum*) is common after typhoid, eruptive, and other fevers, and after other local and systemic disorders interfering with the nutrition of the skin. Frequently, the hairs do not fall for some weeks after the patient has recovered from the constitutional disturbance, but remain in their follicles until pushed out by the new hairs, or until gradually pulled out by the use of brush and comb. In these cases there is usually a general and symmetrical thinning of the hair. The loss is usually temporary, as new hair gradually replaces that which has fallen. Not infrequently, the new hair is more luxuriant, and occasionally of entirely different quality from the old. The alopecia of the early periods of syphilis is of this class, but occurs as a rule in characteristic patches. A slower loss of hair is seen in many cachectic conditions, such as tuberculosis, diabetes, leprosy (in which the alopecia is limited often to the eyebrows and eyelids), and myxedema.

Alopecia Pityrodes (*Alopecia furfuracea*).—Of all the local causes of alopecia pityrodes a seborrhea in some form is the most frequent.

Jackson,¹ in 300 cases of premature alopecia, found 75 per cent. due to seborrhea. Elliot² in 346 cases found over 90 per cent. due to seborrhea. The disorder is usually manifested in early adult life, though persons of both sexes, from twelve to fifteen years of age, may display typical forms of the disease. After the condition known as "dandruff" has existed for some months or years, the subject of the affection discovers a relatively large loss of hair from the scalp, producing thinness of the growth upon the vertex, near the brow, or even the temples. The hairs, when examined, are found to be shortened, dry, harsh, lustreless, and rarely well anointed with sebum. They are rebellious to comb and brush, and project irregularly from the brushed surface. Those shed from the scalp, especially of men, are found to be nearer in type to the lanugo or downy hairs than those which fall physiologically from a vigorous growth of hair in a healthy subject; that is, they are short, thin, pointed, and often with an indistinct medulla.

At the same time the scalp is in process of incessant desquamation, the scales usually being of pityriasic type, and exceedingly abundant so long as the alopecia is not complete, after which the scaling ceases. The mealy, bran-like scales are shed in a fine shower upon the clothing of the patient, and in men, among whom the disease is more common than in women, its traces are often distinct upon the collar of the coat after the fingers have been passed through the hair. The same flour-like, whitish and grayish scales are distinct and plentiful among the hairs to which they cling, and they can also be recognized over the scalp-surface when the latter is inspected with care. Itching is often marked. The scalp may be scratched and torn by the nails, and is in some cases reddened and thickened. In certain cases there develops, sooner or later, the symptoms of dermatitis seborrhoica.

Other local causes of alopecia are found in various inflammatory disorders of the scalp, such as psoriasis and eczema; in scleroderma, morphea, lupus erythematosus, and syphilitic, tuberculous, and other destructive lesions; in some forms of folliculitis, in which the follicle and surrounding tissue are destroyed by suppuration; in ringworm, favus, and other parasitic affections of the scalp; in traumatism, which may occur as a bruise or be the result of scratching or rubbing; after drug ingestion (thallium acetate); and after exposure to the x-rays.

The forms of alopecia described above as encountered upon the scalp may also be found upon other portions of the body, as in the axillæ and pubes; and these also in variable degrees.

Alopecia Senilis.—The senile condition is by no means a synonym for baldness. Many men of advanced years are vigorous and have no loss of hair on the scalp, an abundant pilary growth, grayish and at times silvery white, covering the cranial surface. The alopecia occurring in old age, whether upon the vertex, so as to produce a tonsure like that of the priest, or limited to the frontal region, or so

¹ Jour. Cut. Dis., 1900, xviii, p. 352.

² New York Med. Jour., 1895, lxii, p. 525.

extensive as to involve nearly the entire calvarium, leaving a fringe of hairs at the occiput and temples merely, is always remarkable for its symmetry. There is, hence, a certain degree of dignity added to the appearance of the head that an asymmetrical loss of hair does not produce. It may occur at varying ages of advanced life, and is frequently traceable to an early pityriasis steatoides.

The bald surface, as a rule, is smooth and shining, the atrophy of the pilary system corresponding to that noticeable in other structures of the aged; it is occasionally the seat of a seborrhea oleosa. The hair-follicle, with its accessory sebaceous glands, and occasionally the skin itself, are often in a state of atrophy, though there may be dilatation of the sebaceous glands. There is commonly blanching of the hairs, which are shed gradually, as also of those which remain, though canities is not constant. This condition is much less frequent upon the surface covered by the beard and pubic and axillary hairs, where, according to Michaelson, the hairs in advanced years are often denser than at other periods of life.

Etiology and Pathology.—In alopecia prematura the obvious causes are assigned different weight by different authors. Indoor occupations, and the wearing of stiff hats, which operate not only by the exclusion of sunlight and air, but also by constriction of the scalp about the temples, are factors in etiology. The daily application of cold water to the scalp has not been demonstrated to be causative. A variety of alopecia in which the hair becomes dry, lustreless, and faded, and in which the scalp over the region of the occipito-frontalis aponeurosis becomes stiff and adherent, was described by Harding¹ as occurring after undue exposure to the rays of the sun without head-covering.

In alopecia prematura idiopathica heredity is a factor in many cases. Jackson found 10 per cent. only uncomplicated with pityriasis or seborrhea. In those cases not so complicated, the resemblance to senile alopecia is marked.

As alopecia pityrodes is caused by seborrhea or some form of pityriasis, the direct cause must be looked for in these diseases. The major portion of cases occur before the thirtieth year. Jackson² found 644 out of 1200 cases before the thirtieth and only 113 after the fortieth year. White³ found the disease developing before the twenty-fifth year in 67 per cent. in men and 34 per cent. in women. While baldness occurs much more frequently in men, the records of all show a preponderance of women who apply for treatment for hair-loss; according to White's statistics, in the proportion of 56 to 43.

Alopecia has been explained by a number of writers as due to toxins elaborated in the system. Parker,⁴ for example, has separated from expired air a trichotoxicon believed to originate in the residual air left in the upper portion of the lungs of men living a sedentary life. With the product obtained, this author seems to have produced

¹ Jour. Cut. Dis., 1911, xxix, p. 166.

² Jour. Amer. Med. Assoc., 1910, lv, p. 1074.

³ Loc. cit.

⁴ Ibid., December 23, 1899, p. 1596.

alopecia in pigeons. Meyer believes that the intestinal tract furnishes a similar toxic agent.

Alopecia senilis occurs much more commonly in men than in women, probably in consequence of difference in headdress and the care bestowed upon the scalp. It is attributed to the general atrophic changes which take place in the aged, these changes being exaggerated in the scalp. This atrophy apparently does not explain the cases, often classed as senile alopecia, occurring in men under sixty or seventy years of age, who in all other respects are vigorous. The same causes operative in alopecia pityrodes play a part in some senile cases. Elliot¹ states that the area of baldness corresponds to the area occupied by the epicranial aponeurosis, a structure devoid of muscular fibers; and suggests the possibility of this arrangement being a factor, through retardation of the return flow through the veins and lymphatics, on account of the relative immobility of the structure unless mechanically exercised. Pressure of this aponeurosis is said to be a factor.² The histology shows varying grades of atrophy of all the structures of the skin and appendages.

Michaelson found endarteritis obliterans of the larger blood-vessels and partial obliteration of the capillaries of the hair-follicles. The follicles were diminished, appeared conical, and had patulous mouths. They were filled with loose, horny masses and lanugo hairs. The muscles showed fatty and cloudy degeneration. The sebaceous and coil-glands showed no changes, but there was a cellular infiltration about the latter. Unna largely confirms these findings, and observes little distinction between alopecia senilis and alopecia seborrhoica.

Treatment.—In alopecia, the underlying conditions, local or systemic, must be treated by measures appropriate to each case. Elliot, Jackson, Kreuzfuchs, and others call attention to the great importance of prophylaxis. Early and persistent scalp-massage; permitting the hair to grow at some length, as in the case of women, who preserve the hair, as a rule, better than men; and the wearing of loosely fitting head coverings are of value. The use of brushes and combs in common by members of one family is to be forbidden. The same rule applies to these utensils in hotels, parlor-cars, public resorts of all kinds, and hairdressing establishments. Respecting the covering of the scalp with hats, writers have called attention: (1) to the consequent exclusion of light and air; (2) to pressure upon the circlet above the ears and about the temples, whereby the vascular supply of the vertex is impeded (it is here and over the temples where the thinning of the hair commonly becomes first apparent); (3) to the consequent hypersecretion of sweat (Meyer).

In the management of alopecia, the general health should always be considered, and any condition interfering with the nutrition of the

¹ The Anatomic Factor in the Production of Baldness. George Elliot, Jour. Amer. Med. Assoc., March 29, 1902, p. 814.

² Jackson and McMurtry, p. 79.

scalp should be removed. Cod-liver oil, the ferruginous tonics, and the hypophosphites are indicated in many cases.

The following general considerations are worthy of attention in many cases: Massage of the scalp, practised by the fingers once or twice daily in such a manner as to influence the subdermal structures, is useful. A pillow filled with hair or other equally firm material should be preferred to the feather pillows in common use, and in which the scalp is often too warmly and too deeply cushioned. In the case of women, the wearing of artificial hair should be interdicted, as well as the use of the "crimping-iron" and the curl-paper. Sharp hat- and hair-pins thrust deeply between the hairs are often a source of serious damage. In all patients the access of sunlight in moderation and fresh air is needful for the vigor of the hairs of the scalp. Disuse of the brush and preference for the comb in arranging the hairs on the head of women are responsible for the hair-loss in many instances. Every scalp from which the hairs are falling requires daily gentle, systemic friction with a hair-brush, the bristles of which penetrate to the scalp-surface and stimulate gently without wounding or irritating. Faradization and electricity, being as a rule less systematically available, may be regarded as useful adjuvants in the hands of the expert. Singeing the hairs is, without question, harmful. The hat should be light and well ventilated.

Local treatment is of importance in nearly all cases, and in general is directed toward stimulating the nutrition of the hair-follicle by producing in its periphery a species of transitory and artificial hyperemia. This result is accomplished by the local employment of one or more of the alcoholic, oily, alkaline, and other stimulating applications described below.

Local treatment may often be preceded by shampooing with either the Sarg fluid soap or combinations of glycerin, alcohol, and *sapo mollis* (tincture of green soap); or with eggs, to meet the requirements of individual cases. The shampooing may be practised every few days, once weekly, or once every two or three weeks, according to the needs of the case. The scalp after all such shampooings should be anointed with lanolin, plain or salicylated; vaselin; equal parts of lanolin, glycerin, and rose-water; the oil of benne; or scented castor oil. In obstinate cases the nail-brush may be used vigorously over insensitive scalps at the time of shampooing. A good working plan is to have a shampoo employed once in seven to twenty-one days, this to be followed by the application of the cream or ointment deemed indicated, and on each succeeding or every alternate night apply a lotion. The ointment-bases named above may often be medicated advantageously with sulphur, resorcin, chrysarobin, tar, cantharides, or mercury. Instead of ointments, lotions containing cantharides, phenol, capsicum, resorcin, mercuric chlorid, ammonia, or *nux vomica* may be used. White¹ finds euresol, bichlorid of mercury, tannic acid,

¹ *Loc. cit.*

and chloral hydrate most efficient. Care should be taken to avoid unpleasant staining or dyeing of the hair by both resorcin and chrysarobin. The former should never be compounded with ammonia. Formulæ for lotions and salves to be used in this way are appended:

R—Hydrarg. chlorid. corros.,	gr. v;		33
Alcoholis,	℥ij;	60	
Acid. acet. dil.,	℥ij;	8	
Glycerin.,	℥ss;	15	
Aq. ros.,	℥vj;	180	M.
R—Hydrarg. chlorid. corros.,	gr. iij;		20
Tinct. cantharid.,	℥ss;	15	
Ol. amygdal. dulc.,	℥j;	4	
Spts. rosmarin.,	℥j;	30	
Alcoholis,	℥ij;	60	
Aq. dest.,	q. s. ad ℥vj;	q. s. ad 180	M.
R—Sulphur. præcipit.,	℥j;	4	
Lanolin.,			
Glycerin.,			
Aq. ros.,	āā ℥ijss;	āā 10	M.
R—Hydrarg. chlorid. mit.,	℥iv;	5	33
Hydrarg. ammon.,	℥ij;	2	66
Vaselin.,	ad ℥j;	ad 30	M. (Bronson.)
R—Resorcin.,	℥j;	4	
Quinini (alkaloid),	gr. xv;	1	
Ol. ricini,	℥x-xxx;	0	66-2
Alcoholis,	ad ℥iv;	ad 120	M. (Stelwagon.)
R—Cantharid. tinct.,	℥ij;	8	
Capsici tinct.,	℥xv;	1	
Alcoholis,	℥jss;	45	
Aq. ros.,	ad ℥v;	ad 150	M.
R—Liquor carbonis detergens,	℥ij;	8	
Resorcin.,	℥ij;	8	
Alcoholis, 50%,	q. s. ad ℥viij;	240	M.

Jackson has had best results in idiopathic premature alopecia with the following:

R—Pilocarpin. hydrochlor.,	grs. xx;	1	33
Spts. odorati.,	℥iv;	16	
Aq. ros.,			
Alcoholis,	āā q. s. ad ℥viij;	240	M.

Where the hair is unusually dry, Saalfeld employs:

R—Tannobromini,	gr. xv;	1	
Bals. Peruv.,	℥ss;	2	
Adipis colli equini,	ad ℥j;	30	M.

Where the hair is oily, particularly in women, Jackson endorses the following, devised by Sabouraud:

R—Alcoholis, 90%,	℥viij;	240	
Spts. lavandulæ,			
Spts. etheris,	āā ℥vjss;	26	
Pilocarpin. hydrochlor.,	grs. iv;		25
Liquor ammoniæ,	℥j;	4	M.

In similar cases, Leslie Roberts (personal communication) recommends:

R—Acid. salicylic.,	3ss;	2	25
Sulphur præcip.,	3j;	4	
Hydrarg. chlorid. corros.,	gr. iv;		
Alcoholis,	3ij;	60	
Aquae,	q. s. ad 3iv;	120	M.

Richema and Staganovitch advise:

R—Acid. lactic.,	3ij-iv;	8-16	M.
Alcoholis,	3j;	30	
Aq. ros.,	3j;	30	

To be applied with absorbent cotton, using friction until the surface is reddened.

C. J. White¹ has found the following most useful:

R—Hydrarg. chlor. corros.,	gr. iv;		25
Euresol.,	3ij;	8	
Spts. formicari,	3j;	30	
Ol. ricini,	3j-iiij;	4-12	
Alcoholis, 70%,	q. s. ad 3viij;	240	M.

Walsh advocates: lysol, 1 part; alcohol, 8 parts; and rosewater, 25 parts, adding cantharides if desired. He also recommends a lotion composed of:

R—Acid. salicylic.,	3iiij;	12	M.
Phenolis,	3j;	4	
Ol. ricini.,	3ij;	12	
Alcoholis,	q. s. ad 3vj;	180	

The addition of acetic acid to a scalp-lotion seems to favor penetration of other remedies. Further suggestions regarding the detail of treatment of alopecia and the special remedies recommended for alopecia pityrodes are given under pityriasis simplex capitis and pityriasis steatoides.

Prognosis.—The senile and many of the so-called premature alopecias are practically remediless, though in all forms further loss of hair often can be prevented or greatly retarded by proper treatment. The symptomatic alopecias, in which there is destruction of the hair-follicle, as in lupus erythematosus, syphilitic ulcers, favus, and some forms of folliculitis, are permanent. Those due to systemic disorders and local inflammations are usually temporary. In alopecia pityrodes persistent treatment will prevent further loss of hair, and in recent cases may produce a new growth.

Alopecia Areata.—**Synonyms:** Porrigo Decalvans, Tinea Decalvans, Area Celsi, Area Johnstoni, Alopecia Circumscripta. Fr., Pelade.

Definition.—Alopecia areata is characterized, as a rule, by the loss of hair in circumscribed patches, the latter being round, oval, or irregular in shape, of varying size, and accompanied by little or no

¹ Loc. cit.

evidence of inflammation. Not infrequently, regions other than the scalp are affected, and rarely a total loss of hair occurs.

Symptoms.—Alopecia areata is a disease affecting the hairy surfaces of the body, often limited to the scalp, but at times generalized. It is characterized at the outset by the occurrence of one or several circumscribed, round, or oval areas completely devoid of hair, and exhibiting few if any changes in the affected part. The hair-loss is limited usually to the scalp, but may occur upon the beard, the genitalia, axillæ, brows, eyelids, and general surface of the body. Cases occur, especially in early childhood, in which the closest scrutiny with a glass fails to detect a single filament of hair upon any portion of the skin.

The disease commonly manifests itself by the sudden and complete loss of hair over a circinate, circumscribed patch, usually upon one

FIG. 285



Alopecia areata.

side of the scalp, so rapidly effected that a first discovery of the fact may be made at the morning toilet. Not infrequently, in male patients, the patch is discovered in the barber-shop. Occasionally, vague neurotic sensations precede the hair-loss. In yet other cases the loss of hair is gradual, the patch attaining large dimensions in the course of two or three weeks. Less frequently, an area of baldness may continue to extend peripherally for many weeks. Instead of one area, there commonly are several, which may develop simultaneously or at varying intervals.

The patches may be round, oval, circinate, or irregularly shaped, and may vary in size from that of a small coin upward. They may be so numerous as to disfigure the entire scalp, but though they touch at the borders they can scarcely be said to coalesce, as the individual

areas are usually recognizable. Extension, however, may occur by coalescence of patches as well as by the peripheral enlargement of

FIG. 286



Alopecia areata.

single areas. The surface of the scalp is smooth, soft, whitish, and usually destitute of hair. The affected scalp may be thinner and more

FIG. 287



Alopecia areata.

FIG. 288



Alopecia areata.

lax than normal, and often is depressed slightly below the level of the surrounding skin; in rare instances it is tumid and slightly reddened.

The hairs at the periphery of the patches that have attained their full development are normal in every way and are firmly implanted in their follicles, but at the borders of areas which are still spreading the hairs are loose and fragile and often broken off near the surface, thus leaving short stumps, which exhibit at the bulb a spade-like extremity or an attenuated point, the non-atrophied shaft thus contrasting with the atrophied portion implanted below the cutaneous level. Crocker likens their shape to that of the exclamation-point. Newly formed areas may be covered in greater or less degree with these characteristic hairs, and patches that are spreading show them at the margins, but by the time the process has become stationary these hairs disappear.

As a rule, there are no subjective sensations, though the affected areas may be the seat of slight or severer itching, and are nearly always less sensitive to irritating applications than the surrounding normal parts. In some cases there may be an accompanying cephalalgia, parasthesia, and formication of the skin of the scalp and other regions.

The course of the disease is variable and may persist for months or years without apparent change; or new patches may form, while those of a later date gradually regain, wholly or in part, their pilary growth, which, however, may be lost repeatedly on the same area. Shifting areas of baldness may in this manner invade the entire surface of the scalp, which yet at any moment of time may exhibit a loss of but part of its hairy covering. In other cases, patches occur in rapid succession, and in a comparatively short time the entire scalp has been swept clean. When the hairs begin to reappear, there is commonly a fine, downy growth on the affected area, later replaced by a crop of thicker and stronger, whitish hairs, which are always succeeded, in cases terminating favorably, by a growth of hairs as well colored, as vigorous and as persistent as any which were lost. An odd appearance is often presented by patients who are improving when the young and white new hairs contrast vividly with the dark shade of those on the unaffected scalp.

In young subjects the course of the disease is usually toward a favorable result. There is hope, as a rule, when even the downiest and thinnest growth, requiring a good light and a glass for recognition, can be appreciated. Even when so feebly attached that these hairs are removed with ease by the fingers or brush, and when they spontaneously fall, they may be replaced by a succeeding crop of stronger hairs, which eventually persist. In serious cases, usually after the forty-fifth year of life, and in those of long standing, there may result atrophy of the hair-follicles, in which case the baldness is permanent.

Among the unusual features of the disease may be mentioned the occurrence of alopecia in bands or streaks; at the site of an injury or along the course of a nerve; or over the entire body, removing even the finest lanugo-hairs. Universal alopecia may occur suddenly, or as the result of a gradual thinning of the hair; or it may follow the

existence of the disease in characteristic areas. This variety of alopecia, which is fortunately rare, usually occurs after the middle period of life, and is termed by some writers *malignant alopecia areata*; but it may develop at any age.

Odd-looking effects are produced when in the course of the disease, with and without the development of patches in the scalp, the moustache on one side of the face falls, or the hairs of one eyebrow or one eyelid; or even when all the hairs are lost from both brows and lids on each side of the face.

In some instances alopecia areata is associated with other cutaneous diseases. It not infrequently occurs with ringworm (Cf. chapter on Ringworm for authors quoting such cases). Cases associated with vitiligo are reported by Besnier, Duhring, Freeland, Du Castel, and others.¹ Coincident dystrophy of the nails has been observed by Darier and Le Sourd,² Crocker, G. H. Fox,³ Sequeira,⁴ Weber,⁵ Knowles⁶ and others. Other conditions associated with alopecia areata are scleroderma, thyroid disease, and moniliform hair.⁷ Its association with syphilis has been reported by numbers of observers, including Pusey,⁸ Sabouraud,⁹ Dubois,¹⁰ Pernet,¹¹ Sequeira,¹² Adamson,¹³ the author, and others.

There is reason to believe that the disease has a stadium of evolution and involution, though its exact limits are not known. Few individuals fully recover the hair in less than one year. The majority attain the desired end within a period of two years. These limitations, however, apply to the asymmetrical forms of the disease in the relatively young. The symmetrical alopecia areata of the middle-aged is a far more formidable affection, though in some of these cases, when the loss is recent, proper treatment will restore the hair.

Few diseases are the source of greater mental distress than those of the class under consideration. The fear that they will be suspected of having syphilis, and the social ostracism which the deformity entails produces a morbid mental state, which is especially noticeable in nervous women.

Mewborn¹⁴ has introduced the term *Trichopathophobia* to designate the fear of disease of the hair.

Ophiasis is a form of alopecia occurring more frequently in childhood (Sabouraud states limited to childhood), in which a band two or three inches broad extends over the nape of the neck and around the lower margin of the scalp to the temples in front.

Etiology.—In the modern acceptation, the words "alopecia areata" describe merely a loss of hair occurring at first in restricted areas,

¹ Jour. Cut. Dis., 1909, xxvii, p. 465.

² Jour. Cut. Dis., 1902, xx, p. 574.

³ Ibid., p. 204.

⁴ Walsh, Brit. Med. Jour., 1902, i, pp. 812, 883.

⁵ Jour. Cut. Dis., 1909, xxvii, p. 470; *ibid.*, 1911, xxix, p. 310.

⁶ Annales, November, 1910, p. 545.

⁷ Brit. Jour. Derm., 1911, xxiii, p. 183.

⁸ Ibid., p. 354.

⁹ Annales, 1898, s. iii, p. 1009.

¹⁰ Brit. Jour. Derm., 1912, xxiv, p. 122.

¹¹ Jour. Cut. Dis., 1911, xxix, p. 27.

¹² Ibid., p. 555.

¹³ Ibid.

¹⁴ Jour. Amer. Med. Assoc., vol. i, p. 19.

which may become generalized, and which without question may spring from varying causes. The conflicting views of the nature of the disease have been concerned with the etiological factors supposed to be responsible for the results, and have demonstrated the fact of their multiplicity. The disease is probably seen more frequently in children, but may occur at any age. It affects the sexes in about equal proportions, rather more in persons having dark than in those with light hair, and in all irrespective of social condition. Of the partial and asymmetrical forms, the larger number occur in young subjects, from childhood to early adult life. The severe and generalized forms are encountered more often in middle-aged persons. In the latter class especially the disease is observed occasionally to follow the obscure disorders of the nervous centres due to undue excitation, sudden or prolonged.

Relative to heredity, Sabouraud¹ found the disease directly inherited in 11 out of 100 cases. It not infrequently occurs in several members of a family, such instances being recorded by Schamberg², Kingsbury,³ Whitehouse,⁴ the author, and many others. The three most prominent theories as to its origin are the neuropathic, the parasitic, and the toxic. The neuropathic origin of a large number of cases of alopecia areata is indisputable and verified in every clinical experience. Blows on the head, not rarely resulting in well-marked scars visible on careful inspection of the affected regions; nervous shock (fright, lightning stroke, great and prolonged anxiety, grief); traumatism of other regions than the scalp-surface; prolonged and severe toil in close apartments, these again and again have produced typical clinical symptoms of the disease. Max Joseph⁵ produced baldness in the ears of cats and rabbits by excision of the second cervical ganglion. Surgical operations, for example those in severe mastoid disease, may be followed by alopecia areata. Sequeira⁶ reports a case of proven nervous origin. The most important among reflex causes were brought out by Jacquet,⁷ who found that alopecia areata is associated frequently with defective teeth or other sources of irritation of the cutaneous nerves. Rousseau and Decelle,⁸ Sequeira,⁹ and many others have confirmed Jacquet's hypothesis of reflex origin. Some observers, however, even after careful observation, have failed to discover any connection. Reflex irritation aside from the dental irritation above noted, such as errors of refraction, with consequent headache, may be associated with alopecia areata.¹⁰ In upholding the neurotic theory,

¹ *Annales*, 1911, p. 65.

² *Jour. Cut. Dis.*, 1909, xxvii, p. 219.

³ *Ibid.*, p. 403.

⁴ *Ibid.*, p. 457.

⁵ *Monatshefte*, 1886, v, p. 483.

⁶ *Trans. XVII Internat. Cong. of Med.*, London, 1913, Sec. 13, Part 2, p. 142.

⁷ *Annales*, 1902, s. iv, iii, p. 97.

⁸ *Bull. et. Mem. Soc. med. de Hôp. de Paris*, January 21, 1909, p. 72; *ibid.*, 1910, p. 536.

⁹ *Loc. cit.*

¹⁰ Whitfield, *Trans. XVII Internat. Cong. of Med.*, London, 1913, Sec. 13, Part 2, p. 142; and Kingsbury, *Jour. Cut. Dis.*, 1909, xxvii, p. 211.

Sir Dyce Duckworth¹ states that it would be difficult to conceive either a parasitic or a toxic theory for a case of universal alopecia following shortly after an injury to the head produced by the patient being thrown out of a dog-cart. Permanent loss of all the hairs on the body of such a patient resulted. Numbers of these examples he said could be recounted.

The etiological part played by syphilis in the disorder is important. Sabouraud² states that extensive alopecia is more commonly due to syphilis, either acquired or hereditary, than to any other single disease. Dubois,³ Pernet,⁴ Sequeira,⁵ Adamson,⁶ Pusey,⁷ and others have reported either the coincident occurrence of alopecia areata and syphilis, or the presence of a positive Wassermann or positive results following antisypilitic treatment in these cases.

In favor of the parasitic theory of the origin of this disorder may be mentioned those cases in which the disease begins as a small spot, and gradually and slowly spreads peripherally, with later multiple spots beginning as satellites and going through the same course. Another point in its favor is the occurrence of the disease in epidemics in public institutions and elsewhere. A remarkable example of this sort is recorded by Bowen,⁸ in which 63 out of 69 children in one institution were attacked. More recently Colcott Fox⁹ reported a small epidemic of alopecia areata, 21 girls between the ages of nine and fourteen being affected; and Haldin Davis¹⁰ recorded an epidemic which recurred. In the first instance 174 girls under the age of fourteen years were attacked out of a total number of about 300 in an orphanage. Five months after the complete disappearance of the disorder, a second epidemic began, which attacked 42 of the inmates. Both epidemics yielded soon to vigorous antiseptic treatment and isolation. The distinguishing feature in the recurrent cases was that the patches were smaller than those ordinarily found in the disease. Careful examination ruled out ringworm. Other epidemics have been reported by Hillier (quoted by Colcott Fox), and others in France, Germany, and elsewhere. Sabouraud¹¹ found much of the so-called alopecia areata in schools to be a symptomatic alopecia in patches, preceded and caused by impetigo. Eichhorst,¹² Thin,¹³ von Schlen,¹⁴ Robinson,¹⁵ Walker and Rockwell,¹⁶ Sabouraud,¹⁷ and others have found various micrococci, microbacilli and the *Staphylococcus epidermidis albus* (Welch) in the hair-follicles of the affected patches of alopecia areata.

¹ Trans. XVII Internat. Cong. of Med., London, 1913, Sec. 13, Part 2, p. 140.

² Annales, November, 1910, p. 545.

³ Ibid., p. 554.

⁴ Brit. Jour. Derm., 1911, xxiii, p. 183.

⁵ Loc. cit. and ibid., p. 256.

⁶ Ibid., p. 354.

⁷ Loc. cit.

⁸ Jour. Cut. Dis., 1899, xvii, p. 400 (Two epidemics discussed. The first was recorded by Putnam, Archives of Pediatrics, 1892, ix, p. 595).

⁹ Brit. Jour. Derm., 1913, xxv, p. 51.

¹⁰ Ibid., 1914, xxvi, p. 207.

¹¹ La Clinique, No. 9, p. 1906.

¹² Virchow's Archives, 1899, lxxviii, p. 197.

¹³ Trans. Royal Society, 1881-82, xxxiii, p. 247.

¹⁴ Virchow's Archives, 1885, xciv, p. 327.

¹⁵ Morrow's System, vol. iii, p. 862.

¹⁶ Scottish Med. and Surg. Jour., 1901, viii, p. 12.

¹⁷ Annales, 1896, s. iii, vii, p. 253.

In some of these the organisms have been cultivated, but inoculation experiments have been almost uniformly unsuccessful. Sabouraud, however, in inoculating pure cultures of his microbacillus, produced typical areas in calves, rabbits, and guinea-pigs. In large numbers of attempted inoculations with human beings, Jacquet and all others have failed to reproduce the disease. The epidemics above referred to are suggestive of the theory that there may be a small group of cases that are parasitic, but the parasite remains to be discovered.

The toxic theory of the disorder appears plausible for certain cases, and is illustrated by the production of baldness through injection of thallium.

Meacham¹ records the regrowth of hair during pregnancy in a case of total alopecia, with a relapse after the establishment of menstruation. Sabouraud,² in a recent study of alopecia areata, connects the chronic and severe cases with hyperthyroidism, and further calls attention to the coexistence of ovarian trouble and alopecia areata. Engman and Mook³ record alopecia areata coincident with albuminuria and hyalin casts. Pöhlmann,⁴ after a critical review, concludes that alopecia areata must be regarded as a symptom complex resulting from infection, disturbance of innervation, or intoxication.

Pathology.—The anatomical lesions in alopecia areata have been studied by many investigators, and in the main their findings agree. The interpretation placed upon these findings varies, however. Robinson⁵ believes the process to be an inflammatory one, which is proven by a comprehensive study made in all stages of the disorder. In a small patch of one week's duration he found signs of inflammation in the papillary layer; while lower in the corium there were marked inflammatory changes, evidenced by considerable round-cell, perivascular infiltration in limited areas. The lymph-vessels were dilated, and in some places contained a fibrous coagulum. The sebaceous and sweat-glands and subcutaneous tissue were normal. The hair-follicles were either empty, or contained normal or lanugo hairs. In some cases the hair-papillæ were absent, the lower part of the contents of the follicles consisting of pigmented epithelial cells, which formed a small hair-shaft. A lanugo hair formed farther up in the follicle. Occasionally, there was found a splitting-up and fibrillation of the shaft and an occasional stub hair. In older cases inflammatory reaction could always be observed. In one case of permanent alopecia the hair-follicles and sebaceous glands were destroyed and there was some atrophy of all the tissues of the corium. The hairs themselves show varying stages of atrophy. Giovannini⁶ in the main confirms these findings. Most of the other observers have made similar findings, but the character of the cellular infiltration has different interpretations. This has been looked upon as composed variously of leukocytes (Giovannini), connective-tissue cells (Unna), lymphocytes, and mast-

¹ Brit. Jour. Derm., 1912, xxiv, p. 272.

² Jour. Cut. Dis., 1913, xxxi, p. 268.

³ Loc. cit.

⁴ Annales, 1913, iv, p. 140.

⁵ Archiv, 1913, cxiv, p. 633.

⁶ Annales, 1891, s. iii, ii, p. 921.

cells. Sabouraud believes these findings suggest a disturbance of the nutrition of the follicle through deep-seated inflammation about the hair-papillæ, which early interferes with the growth and later leads to atrophy and destruction both of the hair and of the follicle.

Diagnosis.—Alopecia areata is to be distinguished from vitiligo of the hairy portions of the surface by the preservation of the pilary growth in the disease last named, the filaments, moreover, having usually a whitened look, due to the absence of pigment.

From ringworm of the scalp the disease in question is differentiated by the suddenness of its onset; the absence of stumps of hairs, scales, crusts, and evidences of irritation in the involved area; the whiteness, smoothness, and complete baldness of the latter; and, above all, by the failure to detect with the microscope the presence of a vegetable parasite. Ringworm and alopecia areata may coexist. In cases of so-called "bald ringworm," the diagnosis must rest upon the microscopical findings.

The asymmetrical patches of pityriasis steatoides of the scalp are recognized by the presence of the fatty plates pasting the hairs to the scalp-surface, as well as by the slow and very gradual onset of the disorder.

From the patchy alopecia occurring in the early stages of syphilis, alopecia areata is differentiated by the patches in the former being less sharply defined; by the presence in the patches of tufts of hair, presenting a mangy or worm-eaten appearance; and by the general lack of lustre and the low state of nutrition of all the hairs of the scalp. There may be present also the concomitant symptoms of syphilis.

The alopecia occurring in lupus erythematosus, pseudo pelade, and favus, the late stages of syphilis, and other scar-leaving disorders is readily differentiated by the presence of atrophy and scar-formation.

Treatment.—One necessarily views with distrust all treatment for that disease which in the course of months or years usually terminates in spontaneous recovery, and in the meantime may bid defiance to each and every therapeutic measure. Nevertheless, persistent and hopeful management of even apparently desperate cases is occasionally rewarded by such brilliant results that, however slight may be the foundation for a belief in the value of the therapy employed, it deserves recognition and trial.

The hygienic management of every case is a matter of importance. The general condition of the nervous system should be considered, and may call for change in the habits of working, eating, resting, and exercising. Iron, quinin, nux vomica, cod-liver oil, phosphorus and the hypophosphites, arsenic, and strychnin are often indicated and used with great benefit. Crocker advocates the administration of the nitrate of pilocarpin, $\frac{1}{8}$ to $\frac{1}{4}$ grain (0.008 to 0.016) at night, a flannel night-dress being worn subsequently. Pilocarpin by hypodermic injections into the scalp, in doses from $\frac{1}{30}$ to $\frac{1}{10}$ grain (0.002 to 0.006), is also praised.

Any associated disease or morbid condition should receive appropriate attention. The number of cases presenting some evidence of syphilis makes the treatment of that disease a factor in the therapy of numerous cases of alopecia areata.

There are few patients who are not benefited by daily salt-and-water bathing of the entire body-surface, followed by brisk friction, especially over the spinal region. In the case of children, this treatment must be conducted by a skilled hand. When practicable, the cold douche is preferable.

In all cases in which the scalp is involved in either sex, and in which the special hypochondriasis of the disease is developed, a wig should be worn for the sake of its mental effect upon the sufferer. Its use, however, should be limited to social occasions, as the persistent wearing of a peruke indoors seems to lengthen the course of the disease.

The indications for local treatment are met by the employment of stimulating and antiparasitic preparations. The affected parts are to be bathed daily in water as hot as can be tolerated, then dried and rubbed with a stimulating lotion. After the lotion dries it is well to apply an oil or simple ointment. The articles usually employed are alcohol, ether, resorcin, formaldehyd, turpentine, ammonia, camphor, cantharides, phenol, oil of mace, croton oil, tincture of nux vomica, tincture of capsicum, tincture of aconite, castor oil, tar, iodine, sulphur, and the mercurials. All frequently fail. Several of these substances in combination seem at times to be of service.

The following is a formula the ingredients of which may be varied to suit the indications in different cases:

R—Ol. ricini,	f 3ss;	15	
Phenolis,	3j;	4	
Tinct. cantharid.,	3ss;	15	
Ol. rosmarin.,	gtt. xv;	1	
Alcoholis,	ad f 3iv;	ad 120	M.

Sig.—For external use over the scalp with friction.

Formaldehyd, in solution of 0.5 to 2 per cent., is sometimes efficient. It should be used with care, however, as it has occasioned severe dermatitis, and in several instances has given light hair a green color.

Jackson recommends aqua ammoniæ fortior, applied once or twice daily to the bald areas. Speedy return of hair in a patch of alopecia areata has followed the application of pure creosote and also of trikresol to the denuded surface, resulting in moderate vesication. The latter preparation may be applied in from 50 per cent. to full strength every two weeks on localized patches, usually by the physician. The spirit of turpentine, pure phenol, and acetic acid have similarly been employed; but caustic applications are to be used with caution and over limited areas at a sitting.

By many experts, having in mind the probability of a parasitic origin, epilation is practised to the extent of removing all the loosened hairs and a narrow zone of sound hairs about each patch. The remedies

selected for application are of the order of parasitocides; for example, mercurials, sulphur and its compounds, chrysarobin, pyrogallol, and iodine.

Repeated blisterings of the scalp with cantharidal collodion, croton oil, spirit of green soap, and petroleum have also been employed with success. The ointment of chrysarobin has the disadvantage of staining not only the remaining hairs, but often also the face, in consequence of the frequency of a transmission to that locality through the medium of the hands. When patients, however, consent to the use of chrysarobin it is worthy of trial, as its application has been followed by a vigorous growth of new hair. Hodara¹ states that the application of a 30 per cent. preparation of chrysarobin for from two to eight weeks is followed by vascular and inflammatory changes which lead, through proliferation of prickle-cells and connective-tissue cells, to the formation of new follicles, new sebaceous glands, new papillæ, and new hairs. André employed ten hypodermic injections of pilocarpin hydrochlorid in $\frac{1}{8}$ grain (0.008) doses, which resulted, in the case of a middle-aged woman affected with total symmetrical baldness, in an abundant growth of hair. Mercuric chlorid has similarly been employed.

Phototherapy has been used by Finsen, Forchhammer, Jersild, Løredde, Török, Schmidt, and others, including ourselves, in alopecia areata, with, on the whole, very favorable results.² For circumscribed areas the light-treatment gives better results apparently than are obtained by other methods, though it fails in some instances. It has been used successfully where a number of large areas were present; but in such cases the treatment is tedious, and, as a rule, does not give such good results.

Faradization of the scalp with a stiff wire-brush, pushed to the point of producing moderate hyperemia, has been followed by excellent results. Jackson³ found treatment by means of Piffard's iron spark-gap lamp beneficial.

Wilson recommends:

R—Ol. amygd. dulc.,	f 5j;	4	M.
Tinct. capsici,	f 3ij;	8	
Aqua ammon. fort.,	f 3j;	30	
Spts. rosmarin.,	f 3v;	150	
Ol. limon.,	f 5j;	4	

Another stimulating application is:

R—Ol. terebinth.,					
Ol. ricini,	āā	f 3ss;	āā	15	M.
Tinct. origani,		f 5j;		4	
Ol. camphorat.,		f 3j;		30	
Liniment. ammoniæ,	ad	f 3ij;	ad	90	

Sig.—For external use with a brush until the scalp is irritated.

¹ Jour. Mal. Cut., 1903, xv, p. 644.

² For bibliography, see paper by Frank Hugh Montgomery, Jour. Cut. Dis., 1903, xxi, p. 529.

³ Jour. Cut. Dis., 1910, xxviii, p. 18.

Shaving should regularly be practised when the region of the beard is involved, as the deformity is thus rendered less conspicuous; and the bald surface should be stimulated frequently with one or several of the topical applications named above. Alcoholic solutions of resorcin (3 to 20 per cent.), or of mercuric chlorid, $\frac{1}{2}$ to 1 grain (0.033 to 0.066) to the ounce (30.), are to be well rubbed over the patch or patches once or twice daily.

Prognosis.—From what precedes, it will be inferred that, as regards the relief of the baldness, the asymmetrical development of alopecia areata in youth is much more favorable than the symmetrical general

FIG. 289



Pseudo-pelade. (Fordyce.)

disease of middle life, the latter being often remediless. In all cases the practitioner should actively persevere to the end. In no case should any encouragement be given as to complete relief within a year, though exceptionally short careers of the disease are observed at times. The prognosis of the same affection of the beard is quite favorable, the disease, in young men, usually concluding its stadium in the course of about one year, with a favorable termination.

Alopecia Cicatrisata.¹—**Synonyms:** Pseudo-pelade (Brocq), Alopecia Circumscripta *sen* Orbicularis (Neumann), Alopecie Cicatricielle (Besnier).

¹ Brocq, Lenglét et Ayrygnac, *Annales*, 1905, pp. 1, 97, 209. An extensive exposition of the subject, with review of the literature and clinical and histological research with illustrations. This article was freely consulted in the preparation of this chapter in the text.

Definition.—This is a disease characterized by circular, oval or irregular, variously sized patches of alopecia, associated with atrophy of the skin in the areas, unaccompanied by subjective sensations, and terminating in permanent baldness.

Symptoms.—The areas of alopecia vary in size from that of a pinhead to a small coin and larger; are round, oval, or irregular in shape, white or slightly pinkish in color, and present a shining and atrophic appearance. The large plaques are usually formed by coalescence of smaller ones, and may be of the size of the palm of the hand. In these the contour is irregular or angular, and here and there areas still covered with hair extend into denuded patches.

FIG. 290



Alopecia cicatrisata.

The disorder begins insidiously and on any part of the scalp, but usually over the vertex. Commonly, a few lesions are noted, new ones occurring around this point. Occasionally, large numbers appear suddenly. The most common sites are the vertex, the upper part of the occiput, the temporal regions, and the mastoid. The scalp in the areas presents usually a whitish appearance, rarely a rosy-pink at the border. A few reported cases have been erythematous. The skin is ordinarily thin and soft, atrophied, shining, and rather translucent, suggesting the term "onion skin." At times a genuine atrophy, with scar-formation, follows. In some areas epidermic cones are seen

plugging the hair-follicles. These may crumble the whole surface, suggesting comedones. There are no "exclamation-point" hairs, which are characteristic of alopecia areata, but the loosened hairs when extracted show a somewhat transparent, more or less thickened, pulpy sheath. At the margins there may be furfuraceous scaling. There are no subjective symptoms, but there may be loss or diminution of the pain-sense.

The disease may complete its evolution in three or four months, or may be temporarily stopped by intercurrent disease. The usual course is one of activity, followed by rest. It may last for many years, but the alopecia never becomes complete. Recoveries have been reported. Brocq has never seen such an example. The disorder may be complicated by seborrhea and pityriasis, and nail-changes have been recorded.

Etiology.—The disease is essentially one of adult life, but has been seen in infancy. It is more common in men than in women. It occurs usually in persons with dark, vigorous, coarse and thick hair. Cultural experiments by Sabouraud and others have been negative. Associated disorders, such as keratosis pilaris, have occasionally been observed. The patients have been nervous and impressionable, suffering from attacks of depression. Dental complications have been frequently described. Metabolism determination in a few instances seems to indicate a reduced utilization of nitrogen. In searching for some etiological factor, every means has been exhausted by the author in the case of several patients without result.

Pathology.—The following histological changes were described by Lenglet, in a study of material taken from three cases: The chief pathological change was noted about the blood-vessels in connection with the hair-follicles, but also in other situations. This consisted of an inflammatory, perivascular, cellular infiltration, involving the capillaries around and between the hair-follicles. In these areas enormous dilatation was present, and the vessels were engorged with erythrocytes and a few leukocytes. A perivascular cellular infiltration, composed of lymphocytes chiefly, with some plasma-cells and mast-cells, occurred. These collections of cells are described as commonly occupying half of the length of the sheath of the follicle, terminating below near the papilla. The cellular collections about the hair are greater in volume than those about the vessels at a distance, and their disposition is said to explain the fall of the hair. In the site of the cellular infiltration there is edema of the collagen and disappearance of the elastin. The epidermis shows chiefly secondary changes, being thinned, with the exception of the horny layer, which is slightly thickened. There is absence of the stratum granulosum, and also of the interpapillary prolongations. The sebaceous glands become partially involved in the infiltrate and atrophy. The sweat-glands are more resistant and only disappear after marked sclerosis. Pigment-cells are scattered throughout the corium.

Diagnosis.—The disease is to be differentiated from favus, lupus erythematosus, the late stages of syphilis, and the terminal stages of folliculitis decalvans. In lupus erythematosus the margins may show dilated sebaceous openings and the entire process may be more inflammatory. Outlying lesions behind the ears or in the ears would be of distinct value diagnostically if present. In certain cases a differentiation is almost impossible without the closest observation. The atrophy and scar-formation following favus may closely simulate alopecia cicatrisata, but the history of a previous inflammatory and crusting disorder, and, if any symptoms of that character are present, the demonstration of *Achorion Schönleini*, make the differentiation. The scars induced by syphilis are preceded, as a rule, by ulcerative processes, and in addition there may be lesions in other parts. Moreover, the lesion of syphilis is made up of individual component nodules, evidence of which is usually impressed on the scar. Folliculitis decalvans is

preceded, as the term indicates, by a suppurative inflammation of the hair-follicle, all evidence of which is absent in pseudo-pelade. In the terminal stages of the former disease the inflammatory process has cleared up and differentiation would be difficult; but the history and the location of the lesions, which are more likely to have irregular outlines, would be of value.

Treatment.—Treatment has very little if any effect on the disorder. In the nervous and debilitated patients the general treatment indicated for such conditions should be employed, and in addition the general management of the case in every respect is most important. Brocq suggests removal of the loose hairs and the alternate use of mercurial and sulphur preparations. Crocker employed an ointment of biniodid of hydrargyrum, 2 grains to the ounce. The local treatment, therefore, resolves itself into the use of preparations that are mildly stimulating, but great care should be exercised not to produce overstimulation.

Prognosis.—From what has preceded, it is evident that the prognosis is unfavorable so far as regrowth of hair already lost is concerned. The disease may progress for only a short period of time and be arrested, or continue for some years, with much loss of hair, before its activity ceases. In no case, however, is complete alopecia accomplished. The disfigurement in many cases is sufficient to produce much distress in the mind of the patient.

Folliculitis Decalvans¹ (*Quinquaud's disease*,² *Folliculite épilante*, *Acné décalvante*³).—The disease described under these titles is a scar-leaving alopecia. The disorder begins with pustules or miliary abscesses, punctiform, pinhead-sized and larger, and involving the hair-follicles. In the early stages the lesions resemble those seen in coccogenous sycosis. The hairs piercing the suppurative lesions are loosened and fall, after which the follicles atrophy and the hairs are not reproduced. The lesions are irregularly disseminated about the scalp, producing areas of various sizes and configurations. The scalp is left dead-white, thin, depressed, atrophied, and cicatriform. The follicles remain distinct and are not fused into masses. In older cases only the peripheral portions or the spreading margins of the disorder show the active suppurative processes; and in certain cases, particularly in the variety described as *Acné décalvante*, the spread of the disease may continue after active evidences of inflammation have disappeared.

Etiology.—The disorder is probably of parasitic origin. Quinquaud isolated micrococci, which occurred in various forms (monococcus, diplococcus, and in groups of four), and with these he apparently reproduced the disease in animals. Brocq considers the disease due to *Staphylococcus aureus*. Schwartz,⁴ after using various methods of cultivation, isolated only the *Staphylococcus aureus*. The disease

¹ Grünfeld, Archiv, 1909, xcv, p. 331; abstr. Jour. Cut. Dis., 1910, xxviii, p. 541 (a report of five cases, with review of the literature).

² Bull. de la Soc. med. des Hôp., 1888, s. iii, p. 395.

³ Lailier and Robert, Thèse de Paris, 1889.

⁴ Jour. Cut. Dis., 1913, xxxi, p. 419.

usually occurs in adults. Other predisposing factors are to be cited that may be operative in other follicular infections.

Diagnosis.—The differential diagnosis is that considered under Alopecia cicatrisata.

Treatment.—As the disorder is parasitic in nature, treatment must be directed along these lines. The internal treatment consists in correcting any systemic disorder or other departures from normal in the general health. The local treatment consists in the use of sulphur, resorcin, the mercurials, the tars, salicylic acid, and iodine. Bichlorid of mercury lotions in the strength of 1 to 400, boric-acid lotions, and others suggested in the treatment of alopecia steatoides may be useful. Jackson recommends an ointment composed as follows: Acid salicylic, 15 grains (1 gramme); sulphur colloidal, 1 drachm (4.); adeps lanæ and adeps anserini, of each p.e. add 1 ounce (30.) and ol. rosæ geran., 8 drops. It is suggested that the scalp be washed once or twice weekly and the ointment applied after the hair has dried. Ointments containing sulphur in the strength of 10 per cent., or ammoniated mercury in the same strength, have been of value. To such an ointment salicylic acid or acetic acid may be added to advantage. Epilation of the hairs may be practiced.

Prognosis.—The disease is chronic, and therefore may last over long periods of time. Even after the scalp appears to be entirely cleared up recurrences happen, and frequently large areas are invaded, with consequent deformity from the permanent hair-loss. With careful and continuous treatment much can be accomplished.

DERMATITIS PAPILLARIS CAPILLITII.¹

Synonyms.—Keloid Acne, Sycosis Frambœsiformis (Hebra), Sycosis Nuchæ Necrotisans (Ehrmann), Acné Chéloïdique (Bazin).

This disorder was described by Kaposi in 1869, as being characterized by papules as large as a pinhead occurring upon the back of the neck at the border of the hair; at first isolated, later closely aggregated. These coalesce into scar-like keloidal, projecting, very firm, pale or red plaques, upon which the hairs appear tangled and matted together, while other parts appear entirely bald. The hairs are pulled out with difficulty, break off in the act, and appear twisted and tortuous. The nodules creak when incised, and the cut surface bleeds from numerous points. Here and there a small pustule is seen. A few cases were subsequently reported by other observers, including Hyde;² in 1883, Dyer and Heitzmann³ in America, and others in other parts of the world. The clinical description given by all agrees, all cases concluding with the production of a keloid-like, cicatriform, irregularly

¹ For a survey of the literature, with a clinical and histological report, see Porges, Archiv, 1900, lii, p. 323; Adamson, Brit. Jour. Derm., 1914, xxvi, p. 69 (report of 4 cases, with modern histological study); and Tryb, Derm. Wochenschr., 1912, lv, p. 1491, abstr. Jour. Cut. Dis., 1913, xxxi, p. 184 (a careful histological study and review of the subject).

² Jour. Cut. Dis., 1883, i, pp. 33 and 78.

³ Ibid., 1889, vii, p. 450.

shaped, and circumscribed elevation of the surface. This feature distinguishes the disorder from follicular infections of the hairy region.

The disease is encountered chiefly upon the nucha, the occiput, and the vertex. Samberger¹ recorded an example of the disorder on the upper lip. The disease seems to be due fully as much to an inflammatory process in the subcutaneous tissue between the unyielding pericranium and the thick scalp, as in the cutis proper. Puncture of the pinhead-sized pustules commonly gives exit to the usual quantity of pus, but pressure upon the scalp in the periphery will at once be followed by the appearance of a still larger quantity of similar pus, which evidently is expressed from a circumscribed subcutaneous abscess. When by such pressure the abscess cavity is emptied, it slowly fills with venous blood and produces a firm, semisolid elevation

of the surface, which subsequently undergoes sclerosis, and produces the starved hairs above described. Papillomatous vegetations, crust-covered, hemorrhagic, and with a foul-smelling secretion, sometimes form, and eventually retract into a sclerotic tissue. The disease is chronic in character, is particularly liable to relapse in crops of pustules and papules, and it extends from nucha to vertex, avoiding the frontal and temporal regions.

Etiology and Pathology.—

Irritation from friction by the collar is given as the probable cause. No organism has been isolated. Hebra, Ehrmann,² Sabouraud, and others believe the disease to be a sycosis of



Dermatitis papillaris capillitii. (MacKee.)

staphylococcic origin, with later chronic inflammatory changes. According to Besnier and Doyon, the disease is a papillomatous development, likely to occur in this region of the scalp as a sequel of epilation, cicatricial acne, eczema, or traumatism. The process is described by certain authors as beginning in and around the hair-follicles, in the same manner that an ordinary follicular infection begins; while others describe the earliest process as being in the corium, about the blood-vessels, independent of hair-follicles. Cellular infiltrations are described by all, and later increased connective-tissue formation. In a study of sections taken from four cases, Adamson

¹ Archiv, 1907, lxxxiii, p. 163 (abstr. Brit. Jour. Derm., 1908, xx, p. 23).

² Archiv, 1895, xxxii, p. 324.

concludes that the sequence of events is as follows: first, dilatation of blood-vessels, with deposit of plasma-cells immediately around the vessels; transition of plasma-cells into connective-tissue cells, and young connective-tissue fibers; in other words, the reaction is mainly a fibrous-tissue-cell reaction, the plasma-cell infiltration representing, in the writer's opinion, a stage toward fibrous-tissue deposit. The lesions bear no resemblance to those of true keloid. Unna describes the transformation of the whole substance of the cutis into hypertrophic connective tissue, and believes the condition to be an infectious fibroma, which is not a keloid; nor is the initial folliculitis a sycosis or an acne. Adamson's findings support the view of Kaposi that the disease is a chronic inflammation and connective-tissue new-formation, leading by pressure to atrophy of the follicles, sebaceous and sweat-glands, and is possibly of microbic origin, but not a reaction to ordinary pus cocci.

Treatment.—All of the older methods of treatment prove ineffectual. Radiotherapy is the method of choice in this disorder. In several cases with this method we have succeeded in arresting the active process and causing a partial disappearance of the disfiguring scars. In addition to this method, surgical procedure may be necessary. The affected surfaces should be freed from subcutaneous abscesses by puncture and expression of the contents, and the usual wet dressings employed in surgery applied. When the abscesses have been cleared up, epilation may be practised and the area treated with a 3 to 10 per cent. ointment of sulphur or the same strength ointment of ammoniated mercury. Crusts may be removed by shampoos with green soap. Electrolysis, linear scarification, erosion, excision, and electrocauterization may be used in certain cases.

Prognosis.—In time, with radiotherapy, the disorder may be eradicated. With other measures recurrences are the rule.

COCCOGENOUS SYCOSIS.

Synonyms. — "Non-parasitic" Sycosis, Sycosis Vulgaris, Sycosis Staphylogenes, Mentagra, Ficosis, Folliculitis Barbæ. Ger., Bartfinne, Bartflechte; Fr., Sycose.

Definition.—Sycosis vulgaris is a chronic inflammatory disorder involving the hair-follicles, usually of the bearded region and moustache, characterized by inflammatory papules and pustules, commonly pierced by a hair.

Symptoms.—The lesions appear upon the face, involving one or both cheeks, successively or simultaneously, the chin, the upper lip, and more rarely the eyebrows, the scalp, the axillæ, and the pubes. The disease, however, is almost always limited to the region of the beard in men. It may be limited to one or more small or large areas for long periods of time, or it may involve the entire bearded region.

When seated upon the upper lip, which is a favorite site, the first symptoms may be those of a nasal catarrh; seated elsewhere, an

eczematous attack may precede the onset of the disease. It may be ushered in with the acute symptoms exhibited in the early stage of some forms of eczema, and with tumefaction, accompanied by a sensation of heat and burning; but often a few isolated and indolent lesions, the presence of which scarcely awakens attention, are the first symptoms of the disorder. Soon there may be recognized a larger or smaller number of discrete, pinpoint- to split-pea-sized, flattened or conical, reddish and painful papules, tubercles, or pustules, the anatomical seat of which is distinguished as the hair-follicle by the penetration of each lesion by a filament of hair. These lesions may persist, and when typically discrete and visible at the point at which the hair

FIG. 292



Coccigenous sycosis.

makes its exit from the mouth of the follicle they suggest the appearance of the surface of the fig, whence the disease derives the name sycosis. They are apt to occasion a burning and at times a moderately itching sensation when, on being picked or torn open by the fingers, the pus concretes into a crust at the base of the hair. In severer cases these lesions, while not coalescing, are so closely set together as to form a patch of continuous infiltration. These patches may be weeping or be crusted; in the latter case the crusts are likely to be small and numerous, each crust being limited to the shaft of a single hair, and leaving when removed a minute, crateriform excavation at the mouth of the follicle.

Involution of several lesions may be followed by fresh crops, and sooner or later distinct patches of disease are thus formed. When fully developed, the surface of the skin is reddened, swollen, infiltrated, and thickened; covered irregularly with papules, pustules, crusts, and scales, and frequently with excoriations. The disease often lapses into chronic conditions, and in these chronic cases the deformity is characteristic and totally unlike that produced by the vegetable

FIG. 293



Lupoid sycosis.

parasites. Early in the process the hairs are usually fixed firmly in their follicles, while later, when suppuration is pronounced, they become loosened and may be readily removed. In cases of long standing the hairs are thinned and poorly nourished.

In typical cases of long standing, in which the region of the beard is involved, an important clinical feature is the symmetrical, general, and uniform involvement of the entire surface. The sparse hairs

scarcely serve to disguise the reddened, tumid, painful surface beneath, which displays the severe lesions of the malady. Furuncles, abscesses, cicatrices, vegetations, and eczema of the ears may complicate the process. Sycosis is occasionally acute in its course, but is more often chronic and rebellious. A typically chronic and untreated case of the malady rarely terminates by spontaneous involution.

The thinning of the hairs, described above as a consequence of long persistence of the disease, is far more characteristic than any resulting alopecia; the latter, however, very rarely occurs, but when it does is remediless. The same may be said of resulting cicatrization, which is one of the rarest consequences.

Sycosis vulgaris is a disease of chronic course, which may endure for years and be characterized by relapses and aggravations, but is entirely curable; it is only in neglected cases that such persistence may be expected.

In certain rare instances the disease assumes a more destructive character. In these the usual pustules form and the disease spreads peripherally, causing destruction of the follicles, and leaving permanent scars. The active margin with an atrophic centre resembles lupus, and to this form Milton gave the name *Lupoid sycosis*. Unna later described it as *Ulerythema sycosiforme*. According to Robinson, the inflammation in these cases spreads peripherally, upward or downward, with a narrow, infiltrated margin. The lesions outside of the follicles may be papular, vesicular, or pustular in type. The tendency to extension from a given centre and to irregular scarring are the chief characteristic features of this phase of the malady.

Many of these cases strongly suggest in their features the symptoms of lupus erythematosus. The malady is exceedingly obstinate and lasts for years.

Etiology.—Sycosis vulgaris is unquestionably due to invasion of the pilo-sebaceous follicles by microorganisms. Obviously, in many cases there is a special reason for the accessibility of the germs to the crypts where they are lodged. Shaving, and the use in common of towels, brushes, or combs in public establishments (club-houses, barber-shops, hotels), and the employment of pillows, lounges, and reclining-chairs in public resorts, are often the origin of the disease.

The disorder is encountered chiefly among men after puberty, and in those of all social conditions and grades of health. It is not transmissible by heredity. The mere performance of shaving is not known to produce it. At times the immediate cause of the disease is recognized when the upper lip is constantly irritated by a discharge due to profuse nasal catarrh. In other cases, again, all the causes of eczema may be invoked in explanation of the result.

Pathology.—The essential process is an indolent type of folliculitis and perifolliculitis caused by microorganisms. Bockhardt was the first to identify the pyogenic organisms (*Staphylococcus aureus* and *albus*) as causative factors. According to Robinson, the process begins as a perifollicular inflammation, the follicle later becoming transformed

into an abscess. The early changes as described about the follicles correspond with those ordinarily seen in the vascular connective tissue of any region: Serum and other products of the inflammatory process penetrate the hair-follicle and produce swelling and disintegration of its cellular elements. The process is most marked in the lower part and spreads upward, the pus breaking through the epidermis around the follicle. When the hair is removed the cavity is found to be lined with pus-cells. The sebaceous glands are involved after the follicle, while the sweat-coils are rarely attacked. The papillæ usually escape destruction, so that permanent alopecia seldom follows. Unna describes the process as occurring in four stages: the first superficial, involving the neck of the follicle; the second a superficial, perifollicular, inflammatory process; the third a limited perifollicular abscess occupying only one side of the follicle; and the fourth a widespread suppurative process, which involves the whole follicle, is destructive and induces scar-formation. In lupoid sycosis all the structures about the hair, including the hair-papilla, are destroyed, leaving a permanent scar. The microorganisms discovered by Tommasoli in what appeared to be a superficial sycosis were bacilli measuring 1 to $1\frac{1}{2}$ microns in length by 0.25 to 0.3 microns in width. Cultures were made from these organisms and the disease reproduced.

Treatment.—The treatment of cases necessarily varies according to the condition. Where there are much tenderness, pain, swelling, pustulation, and crusting, these must be relieved by appropriate measures. Hot dressings of boric-acid solution applied several times daily are of value. At the same time a soothing ointment may be applied between the applications. In Vienna, the unguentum diachylon alba of Hebra is applied on strips of linen and firmly bandaged over the cheeks, chin, or lips and kept in place for twenty-four hours. After the marked inflammatory symptoms have been reduced, and in all other ordinary cases, the local treatment should be as follows: Shaving should be practised daily, or at least every other day. This may be painful, but should be insisted upon. In the evening hot applications are made, using a solution of the bichlorid of mercury in the strength of 1 to 2000, after which an ointment containing the ammoniated mercury in the strength of from 3 to 5 per cent. is applied. In the morning the area is bathed with the bichlorid solution and a dusting-powder, consisting of the mild chlorid of mercury 4 parts, boric acid 4 parts, and talcum powder 20 parts, is applied. In a short time great improvement is noted following this treatment. When the process becomes stationary, the same treatment should be employed, but in the place of the bichlorid of mercury the bathing should be done with boric-acid solution. The ointment following the bath should consist of sulphur in the strength of 3 to 5 per cent.; and in the morning, in the place of the mild chlorid of mercury, sulphur should be substituted in the dusting-powder. At a later date, in case it becomes necessary, other stimulating preparations, among which are the tars, resorcin, and salicylic acid, may

be employed. In still other cases, ointments and lotions of ichthyol are of service.

Epilation is often essential for the relief of the disorder and is a valuable measure, a fact well demonstrated in the rapid relief of cases in which epilation follows the use of x-rays.

Van Harlingen advises for acute cases a wash composed of $\frac{1}{2}$ pint (250.) of rosewater, to which 1 drachm (4.) each of precipitated zinc carbonate and zinc oxid in powder have been added, with 2 drachms (8.) of glycerin and dilute liquor plumbi subacetatis. Veiel recommends a solution of pyrogallol (1 part to 50) for painting over the region affected, followed in the day by emollient cataplasms and in the night by diachylon or weak tannin ointments. Sycosis of other portions of the body is to be treated as described for the region of the beard.

In view of the parasitic nature of the disease, vaccine therapy¹ has been given a thorough trial. The results in sycosis have been similar to those in other diseases, sometimes brilliant, sometimes a total failure. It is difficult, as Schamberg early remarked, to account for the fact that of two patients treated similarly one will respond perfectly and the other show no evidence whatever of the treatment. It is a valuable addition in most cases, entirely relieves some, and is therefore worthy of trial.

Radiotherapy² offers another valuable method of treatment. When used in moderation (merely enough to cause epilation of the hairs), the immediate results are good, and with this amount of treatment no remote ill effects follow. On the regrowth of the hairs, which occurs in about two months, recurrence may happen, but this, as a rule, occurs in more limited areas and can safely be treated a second time. This agent should always be employed with caution, and when so employed nothing but happy results occur.

Internal treatment should be employed according to the indications of the individual patient. Owing to the chronic character of the disease, numbers of these patients when first seen have been taking various sorts of internal treatment; a suspension of this is followed by improvement. Every sort of external irritation should be avoided during treatment. The diet should conform to the needs of the particular patient. A tonic treatment is suggested in the case of patients whose general condition is poor and whose nutrition is below par. It is also essential to promote the eliminative processes by the free use of water and by the use of proper medication when indicated.

Prognosis.—The disease is entirely curable, and will in a large majority of cases either entirely disappear or be greatly improved by judicious treatment. The latter requires the personal supervision of the physician and calls for attention to details. In exceptional

¹ Colecott Fox, *Brit. Jour. Derm.*, 1907, xix, p. 420; Gildersleeve, *Jour. Cut. Dis.*, 1907, xxv, p. 320; Schamberg, *Trans. VI Internat. Derm. Cong.*, p. 290; MacKee, *Jour. Cut. Dis.*, 1913, xxxi, p. 1042.

² Howard Fox, *Jour. Cut. Dis.*, 1908, xxvi, pp. 185 and 464; *ibid.*, 1909, xxvii, p. 357. and Pfuler, *ibid.*, 1913, xxxi, p. 116.

cases the disorder is exceedingly chronic and obstinate and requires a great amount of time for its eradication, and it must be remembered that relapses are of frequent occurrence. In the few rare cases of lupoid sycosis, there is cicatricial tissue left after the disappearance of the disorder.

DISEASES OF THE NAILS.¹

ONYCHAUXIS.

Synonyms.—Hypertrophy of Nail, Onychogryphosis.

The term onychauxis signifies hypertrophy of the nail. This condition may involve one or more nails of both hands and feet, either as an idiopathic or symptomatic affection. The nails may be augmented in length, breadth, or thickness, and changed in shape, density, color, or texture. The term onychogryphosis is restricted by most English authors to the condition in which twisted, contorted, and other anomalies of the nails are present. In the latter condition the nail, particularly of the great toe, becomes claw-like or twisted like a horn. Occasionally, other nails of the toes, and rarely of the fingers, become involved. There is marked thickening, due to hyperkeratosis of the nail-bed beneath, the nail-plate not being particularly involved. In the cases not characterized by this peculiarity the nail-plate may be increased in all dimensions, uniformly or partially. The nails are dull-colored, opaque, yellowish-brown or dirty-black in hue, and are often ridged, rugous, or furrowed. The subungual space is choked with poorly-formed corneous material, which may be at times secondarily infected. Occasionally the subungual horny deposit raises the nail from its bed at the distal end. A remarkable series of this latter variety, occurring as an hereditary disorder, was recorded by Wilson.² In these cases the nail at the base was normal in appearance, but at the free extremity became raised over its bed by a dark, friable, horny mass, which projected from the free edge. Simpson³ described the case of a child of eleven years whose nails, both of the fingers and toes, had since birth projected upward from one-half to three-fourths of an inch. Zeisler⁴ recorded

¹ Heller, Mraček's *Handbuch der Hautkrankheiten*, 1909, vol. iv, Part 2 (with references and thorough exposition of the subject). White, C. J., *Boston Med. and Surg. Jour.*, cxlvii, 1902, No. 20, p. 537 (a clinical study of 485 cases of nail disease). Shoemaker, *Jour. Cut. Dis.*, 1890, viii, pp. 334, 388, 419, 476 (with references and abstracts). Hutchinson's *Arch. of Surgery*, 1890-1891, vol. xi, p. 237. Montgomery, D. W., *Twentieth Century Practice*, vol. v. *Trans. Amer. Derm. Assoc.*, 1901, p. 111 (symposium on Dis. of Nails: Grindon, Pollitzer, Zeisler, Hardaway). Pernet, *Encycloped. Med.*, vol. viii, 1901 (with bibliography). *Atlas of Ill. of Med., Surg., and Path.*, London, New Sydenham Society, 1906. Dubreuilh, *La Pratique Derm.*, Paris, 1902, p. 607, art. *Ongles* (with illustrations). Jackson, *Jour. Cut. Dis.*, 1905, xxiii, p. 153 (12 clinical cases). Hartzell, *University of Pennsylvania Med. Bull.*, Oct., 1904.

² *Brit. Jour. Derm.*, 1905, xvii, p. 13.

³ *Lancet*, April 14, 1888, p. 772.

⁴ *Jour. Cut. Dis.*, 1901, xix, p. 511.

the case of an infant three months of age whose nails were similar to those described above, and when the nail was cut a thick, oily, serum-like substance escaped. Nicolle and Halipré,¹ White,² and Eisenstedt³ have all described groups of cases having an associated dystrophic process in the nails and atrophic processes of the hair, occurring in several generations. In the first instance there were 36 individuals in six generations; in the second, the disease occurred in four generations; and in the third there were several cases in five generations. In these there occurred both hypertrophic and atrophic changes, with subungual inflammation.

FIG. 294



Onychogryphosis in a leper, a Hindoo afflicted with the neural form of leprosy.
(Douglass W. Montgomery.)

The causes of this disorder are various. Local irritation from pressure or ill-fitting shoes, stockings or gloves, filth, neglect, and the exposures producing inflammation of the skin of the hands may all be responsible for the condition.

Onychia (*Onychitis*) is the result of inflammation of the matrix or folds of the nail; and may be produced by any of the causes capable of exciting inflammation in other regions of the integument. Trauma, the pyogenic microorganisms, foreign bodies beneath or within the nail-plate, or parasites may excite inflammation of the soft parts

¹ Annales, 1895, s. iii, vi, p. 804.

² Jour. Amer. Med. Assoc., 1913, ix, p. 27.

³ Jour. Cut. Dis., 1896, xiv, p. 220.

about the nail sufficient to produce distortion, fall of the plate, ulceration, and even digital gangrene.

Onychia Maligna, whether occurring in children or adults, since the date of modern methods in diagnosis and therapy has become practically unknown. It may be due to struma, syphilis, tuberculosis, septicemia, or to any infectious process. Commonly, an ulcer forms at the border of the nail, which gradually develops a necrotic floor and edge. A severe phlegmonous process complicates some cases.

Paronychia (*Panaritium*, *Whitlow*).—This condition may involve one or several nails, and the inflammatory process be of moderate

FIG. 295



Onychogryphosis. (Douglass W. Montgomery.)

or severe grade. The disorder is said by Sabouraud to be due to a streptococcic infection, but other organisms are commonly found. Morrow and Lee¹ in 16 cases found *Staphylococcus albus*. In the milder varieties, one, two or more nails are involved in a moderate inflammatory process, in which there occur redness and some swelling in the nail-fold, either in part or entirely surrounding the nail. As a rule, a moderate amount of tenderness and some pain are present. In a more severe grade the symptoms are intensified and a purulent

¹ Jour. Cut. Dis., 1915, xxxiii.

inflammation, with accompanying discharge, is present. In these cases markedly painful sensations occur and the fingers are exquisitely tender to the touch. In a still more severe grade, which is practically a surgical affection, the process spreads to the surrounding tissues, producing marked swelling of the entire digit, inducing eventually suppuration, necrosis, and at times exfoliation of the bone of the involved phalanx. A series of whitlows is a characteristic symptom of Morvan's disease.

Unguis Incarnatus (*Ingrowing Nail*) occurs when an edge of the nail-plate impinges abnormally upon the soft parts in the vicinity and excites irritation. The ingrowth may occur to such an extent as to bury the edge of the plate deeply in a sulcus or ulcerated furrow on one side or the other of the soft parts, where it operates precisely like a foreign body. Often an exquisitely tender, granulating wound results, requiring surgical relief. The condition is one most often occurring in the feet, and particularly in the great toe, because of pressure effects from the coverings of the feet.

Pterygium.—The fold of the epidermal structure which in health furnishes the proximal border of the nail-plate may advance to a greater or less extent over the plate. In adult life, this advance may be due to radiotherapeutic treatment of the fingers when the nails are exposed to the rays. In some cases the condition is the result of neglect of hygiene of the nails, and occasionally produces a considerable disfigurement. Heller describes it as at times congenital, the nail of the big toe being set as if in a cap. The treatment is by hygiene of the nails and the use of the cuticle-knife.

Hangnails, Agnails (Ger., *Nietnagel*; Fr., *Envies*) originate from tags of the lateral nail-folds, detached mechanically and torn upward. At times the rift penetrates deeply into the sulcus by the side of the nail, leaving thus an ample atrium for infection with microorganisms. This may be the first step toward the production of a grave onychia terminating in exfoliation of the distal phalanx. In yet other cases chancres form in the part and syphilis follows. Biting and picking of the nails is a frequent cause of these apparently trivial affections. The treatment is by aseptic dressing, protection by sealing up the small wound, and, in severe cases, excision.

Subungual Hemorrhage is believed by Unna to be responsible for many otherwise unexplained cases of shedding of the nail. In some instances the hemorrhages are microscopic and appear only on section of nail-tissue. In other cases minute reddish or reddish-black specks become visible beneath the plate. In extreme cases the entire matrix becomes blackish from effused blood. The nail is shed when the process is sufficiently extensive to produce separation of the plate from the bed. Subungual hemorrhages occur after trauma; in scurvy; in hemophilia; and in certain disorders of the nervous centres (epilepsy). MacLeod¹ recorded the occurrence of subungual hemorrhage in a

¹ Brit. Jour. Derm., 1911, xxiii, p. 364 (Hemorrhage into the nail-matrix and nail-bed of the finger-nails).

patient having a weak peripheral circulation. Pringle reported a similar case occurring in a Raynaud's subject. Removal of the plate may be required in surgical cases.

Subungual tumor-formation occurs rarely. Dr. Shepard¹ reports a subungual chondroma. Hutchinson, Jr.,² recognized an epithelioma in this situation; Kraske (cited by Shoemaker) a sarcoma. We have seen a number of corns growing beneath the plates. Heller gives details of other subungual tumors recognized by different authors, including papilloma, fibroma, leiomyoma, endothelioma, angioma, and angiosarcoma. Telangiectases have also been noted.

ATROPHIA UNGUIUM.

Onychatrophia (Fr., *Onychatrophie*).—Atrophy of the nails is always a symptomatic condition, due either to a local or systemic influence, whereby the formation of the horny material of the nail is rendered either wholly abortive or defective. In these cases the nail-plates may be changed in bulk, color, elasticity, firmness, shape, or position. They may be thinned and expanded, narrow and acuminate, friable, furrowed, laminated, ridged, or in other ways distorted. They may be striped, irregularly speckled, lustreless, or have a characteristic dull-yellowish color with "worm-eaten" aspect. In other conditions the nails are split or even crumbling, so that the relics only of the nail-substance are visible near the matrix, one-half or more of the distal flange having disappeared. In yet other cases sparse, horny spurs, "flakes," or pegs of a dull-greenish or dirty hue project from the proximal portions of the nail-bed.

Hapalonychia.—Under this title Kaposi has described a condition of atrophy in which, through defective nail-production, the plates become softened and correspondingly weakened, being thus the more readily split and folded.

Koilonychia (*Spoon-nails*; Ger., *Aushöhlung der Nägel*).—In this condition, which has been described by Crocker,³ Rille,⁴ and others, the nail-plates are thinned and present a concavity more marked transversely than from before backward. It begins on one finger, others gradually becoming involved. In Crocker's case it occurred in association with lichen planus. It has accompanied acanthosis nigricans and certain wasting diseases, and has been associated with leukonychia. It has been described as occurring in several members of a family and for several generations. Among other causes mentioned is the immersion of the hands in strong alkalies, but the etiology in many cases is obscure.

Onychoschizia (*Onycholysis*; Fr., *Décollement des Ongles*).—In this condition the nail is loosened in varying degrees from its bed. It indicates a separation of the nail without shedding, and occurs as

¹ Trans. Amer. Med. Assoc., 1901, p. 138.

² Trans. Path. Soc., London, xxxvi, p. 468.

³ Diseases of the Skin, p. 1257.

⁴ Case cited by Heller, with illustration, Die Krankh. der Nägel, etc., p. 136.

a symptomatic process in psoriasis, eczema, and syphilis, in which condition collections of cells beneath the nail mechanically raise it. It may also be induced in a similar manner by corns. Idiopathic neurotic cases are described by Dubreuilh and others.¹ In these the process begins at the free end or at one corner and gradually progresses until it has involved the entire nail as far as the lunule. Heller² describes a case of onycholysis partialis, associated with hyperidrosis, in which the nail-plates were loosened, the process beginning at the free border and extending until only a small portion of the nail remained attached.

In the condition described by Hyde³ under the title, "The egg-shell nail," the nail-plates are thinned and show a tendency to an upward thrust of the free border after leaving the nail-bed. The free portion is abnormally whitish in hue, suggesting the pinkish-white color of the inside of a hen's egg. The nails appear more translucent than normal, and their transverse curve may be exaggerated. In the cases he described there was an associated hyperidrosis.

Onychomadesis (*Onychoptosis*; *Alopecia unguialis*; *Defluvium unguium*).—Total and intermittent shedding of the nails occurs in many conditions, and is not infrequently connected with systemic affections of a severe grade. All of the nails may be shed or only certain ones of the fingers and toes. After a severe attack of scarlet fever the nails may all be shed with the skin of the palms and soles. They may also be shed in connection with generalized alopecia areata, syphilis and diabetes. Local inflammation involving the nail-bed and matrix, such as that occurring in onychia and paronychia, not infrequently produces the condition. Fox⁴ describes exfoliation, with no change in the texture of the nails, in onychia without suppuration. Falcone⁵ records recurrent shedding of the nails associated with inflammatory changes in the matrix, occurring in a neurotic patient. D. W. Montgomery⁶ recorded a case of hereditary and continuous shedding of the finger-nails in a male patient, aged thirty-five years, who had suffered with the disorder since birth. The nails of the mother and two maternal uncles had been similarly affected. One or two of the nails were constantly falling after a yellowish-white change in the lunula.

Leukonychia (*Leukopathia unguium*, *Achromia unguium*, *Albugo*, "White Spots," *Flores unguium*, "Gift Spots," *Canities unguium*. Fr., *Décolorization des Ongles*).—In this condition either small areas or the entire nail-plate may be involved. Usually white points, spots, streaks, or bands occur, beginning near the lunula, and with the growth of the nail gradually progress toward the free border. The

¹ Weber, Brit. Jour. Derm., 1911, xxiii, p. 235 (Trophoneurotic separation of the nails, followed by alopecia areata); *ibid.*, 1912, xxiv, p. 204.

² Derm. Zeitschr., July, 1912, xix, p. 609; abstr. Jour. Cut. Dis., 1913, xxxi, p. 279.

³ Jour. Cut. Dis., 1906, xxiv, p. 145.

⁴ Brit. Jour. Derm., 1895, vii, p. 389.

⁵ Gaz. d'Osped., Milano, 1887, viii, p. 156; *ibid.*, Giorn., 1887, p. 206.

⁶ Jour. Cut. Dis., 1897, xv, p. 374.

condition is found chiefly in young subjects and upon the nails of the fingers. At times but a single or a few nails may exhibit one or several points of discoloration. In other instances every nail is the seat of numerous spots or bars, some occupying the larger portion of the nail-plate.

The causes of the condition are obscure. In some cases, as in those described by Longstreth,¹ Shoemaker, and Giovannini,² the condition is apparently related to nervous or systemic disorders. The pathogenesis of the disease is not understood. It is believed by some to be a trophoneurosis. Traumatism of the proximal portion of the plate, as in operations of the manicure, are given by Heidingsfeld³ and others as the cause in a number of cases. It is usually stated that the white spots are due to air occurring between the epithelial cells. Heidingsfeld⁴ found in the whitened areas imperfect keratinization, to which he attributed the clinical changes. Sibley⁵ recorded the presence of nuclei in the cells in the situation, showing imperfect keratinization of the cell.

Onychorrexia ("Reedy nails").—Splitting of one or all of the nail-plates, usually in longitudinal lines, affects in inconspicuous degree many persons. When exaggerated, the nail-plate is thinned and presents longitudinal fracture, the free ends being broken, split, and thinned. Fluted, ridged, or reeded nails are described as being a manifestation of gout by Laycock, Duckworth⁶ and others. They also occur in elderly people, and are then only one of many senile atrophic changes (Crocker).

Transverse Furrows (*Beau's Lines*).—Transversely directed lines or furrows in the nail-plates are the frequent, or perhaps invariable, consequence of impairment of nail nutrition, either systemic or local. They are first seen over the lunule and gradually progress forward with the growth of the nail. They may be well marked or only indistinctly visible. They occur in various diseases; from nervous shocks, following accident or otherwise, attacks of sea-sickness⁷ and other conditions. It is frequently possible to determine approximately the date of the illness, accident, or other condition that has caused the line by noting its relative position on the nail, recognizing the fact that it takes approximately six months for the nail to grow in its entirety. A number of lines may indicate a recurrence of the former trouble or new exciting causes. Zeisler⁸ in a study of his own case, following a fracture of the thigh, noted an arrest in growth of the nails on the affected side for some weeks. The ridge formed at the time, gradually extended

¹ Trans. College of Physicians, Philadelphia, s. iii, vol. viii, p. 113.

² Reform Med., Naples, 1891, vii, pl. 2, p. 865.

³ Jour. Cut. Dis., 1900, xviii, p. 490.

⁴ Loc. cit.

⁵ Brit. Jour. Derm., 1911, xxiii, p. 281 (report of a case of leukonychia, with analysis of many recorded cases; also describing a case with yellowish discoloration, *Unghes flavi*).

⁶ Quoted by Crocker, p. 1261.

⁷ Hartzell, Trans. Amer. Derm. Assoc., 1901, p. 140.

⁸ Jour. Cut. Dis., 1898, xvi, p. 305.

forward, and divided the plate into a distal thin and atrophic portion and a proximal strong and normal area.

Etiology and Pathology.—Some etiological factors have been already mentioned. In onychia local irritations from traumatism, pressure, and occupations exposing the parts to the action of chemical and other agents, as well as to heat and cold, may all be factors. Dr. Hyde laid stress upon the association of dysidrosis, with its frequent attendant circulatory disturbances. The condition occurs also through neglect; also in connection with constitutional diseases, such as lepra.

Onychia may be idiopathic from injury; occur as the result of constitutional disease; or be produced by local microbic infection. In paronychia the exciting cause is a microorganism, either a streptococcus or a staphylococcus, with a number of predisposing agents, such as

FIG. 296



Transverse furrows, following scarlet fever. (Foerster.)

trauma from unskilled manicuring, irritation from an hypertrophied nail, and other factors mentioned as productive of onychosis.

The etiological factors concerned in the various atrophic conditions described were given with each individual description.

Treatment.—The indications are always, so far as practicable, to discover and remove if possible the remote and immediate causes of the affections.

In onychia any circulatory disturbances present should be corrected. The diet should be restricted, stimulants avoided, and sweets used in moderation. The systemic conditions found should be treated in accordance with the rules laid down in general medicine. In the anemic and asthenic, ferruginous preparations, cod-liver oil, and tonics in general are indicated.

Locally, the nails may be bathed at night with mild alkaline solutions containing bicarbonate of sodium or baborate of sodium, after which

the irregularities may be removed to a degree by scraping with glass or other sharp instrument. Shampooing with the tincture of green soap during the process is of value, and the application of a soothing ointment for the night is indicated. The latter may contain zinc oxid and bismuth, lead oleate, or other similar preparations. Much time is required in some cases to accomplish results.

The management of exaggerated cases of onychogryphosis is surgical.

In onychia local antiseptic dressings are employed. In cases with suppuration, the focal points are to be drained by incision, and in severe cases removal of the nail may be necessary. In most cases thorough local disinfection is required and the application of preparations such as ammoniated mercury, ichthyol, or salicylic acid in the form of a lotion or an ointment.

Paronychia, being chronic in many cases, requires great care for its relief. The local treatment suggested for onychia is indicated here. Radiotherapy has been of the greatest service to the author. In cases with ulcerations and granulations, silver nitrate may be used. Plaster-mulls containing ichthyol or mercury may be used in certain cases. Morrow and Lee¹ obtained uniformly good results by using a saturated solution of chrysarobin in chloroform, this preparation being thoroughly swabbed and packed into the area, occasionally preceding the packing by a slight incision, if necessary. In a group of 16 cases recovery took place in from one to three weeks. Finally, in these cases, the irritating cause of the disease should, if possible, be removed. Morrow and Lee discovered no significance in the vocation of their patients.

The treatment of the several varieties in which atrophy is a prominent feature resolves itself into the management of the general condition with which it is associated. A number of the disorders require no treatment, and in a number of others the treatment in the way of local applications is similar to that outlined above. Arsenic has been of value in some cases.

MORBID CONDITION OF THE NAILS INDUCED BY CUTANEOUS DISEASES.

Psoriasis.—The nails of the hands and the feet (one, several, or all) may be slightly or extensively changed in psoriasis. Most commonly, there is a concurrent psoriasis of the general integument; but in rare cases the nails only are involved. There are several types of this localization.

In the most common form the first symptom of a variation from the normal occurs in the distal portion, as distinguished from many of the eczematous changes in the nail which spring from the root. In this initial stage, the margin of one or more nails near the free border loses its natural hue; the edge of the plate is visibly loosened from its

¹ Loc. cit.

attachments; and a thin, granular mass interposes between the damaged portion of the nail and its bed. The plate at this point, being friable, may either remain in place by reason of its attachment to the sound portion, or it may break away. Patients usually pare off this portion before it is presented for examination. The process slowly advances upward to the root of the nail on one or both sides. As a rule, the nails attacked seem to be indiscriminately selected; in other cases, however, there is symmetrical involvement of all the nails of both hands and feet.

In what has been termed the "pure type" of psoriasis of the nails (*consomption dartreuse*, of Alibert; *psoriasis punctata unguium*) the process is less common and rather more conformable to that observed in tegumentary lesions. Multiple, pinhead-sized and smaller punctate lesions, often rather regularly disposed, represent points of softening of the nail-substance, where, after desquamation of the horny material, equally minute sunken depressions are left in the plate, a condition which has been likened to the exterior surface of a thimble. When the process is both exaggerated and diffused, a deep transverse furrow spreads across the nail-plate; the latter, both above and below this groove, may be normal.

In many cases of psoriasis the changes when well advanced are difficult to classify, the picture presented being that of numerous lesions due to malnutrition. "Worm-eaten," pitted, friable, and discolored nails, some split, some fractured, may leave a crumbling-edged, well-attached stump, the distal quarter or half the plate missing; and the exposed matrix covered with an imperfectly formed, horny epidermis.

In many cases where psoriasis affects the nails there is well-marked subungual keratoma, which may proceed to the point of partially detaching the nail from the bed, though the former is not often actually shed. In exceptionally severe cases, the nails are greatly thickened, distorted, dislocated, or destroyed.

Eczema.—Changes in the nails are frequently found in association with eczema of the fingers or other portions of the cutaneous surface. They are characterized by their multiformity and are largely due to nutritional disturbances.

When the parts adjacent to the nail-plates are the seat of an eczema, the latter are well-nigh invariably changed, losing their normal color and becoming discolored and dirty-yellowish in hue, furrowed, "worm-eaten," brittle, split in various directions; and the nail-bed may become the seat of a parakeratosis, at its lateral and distal portions inducing collections of scales under the plate, which increases its convexity. Later this plate may be thinned and finally exfoliated. The chief change is a marked interference with nutrition. Many of the changes noted are secondary (as in the eczematous skin), the sequels of traumatism, or friction, operating upon a weakened surface. Eczemas practically limited to the finger-tips, associated with nail-changes, occur often in workers in chemicals (*e. g.*, in physicians, chemists, photographers),

in bartenders, laundry-workers, grocers, confectioners, and the like. In right-handed persons, the right hand is commonly most involved, and the most employed parts of the hand (thumb, index, and adjacent fingers) in proportionate measure show the character and grade of the local irritation.

Diagnosis.—Psoriasis and eczema of the nails are to be distinguished from ringworm, favus, syphilis, and onychia caused by pus-infection of the same region. The coincident involvement of the skin with the disorders mentioned, and a microscopic examination of nail-scrapings, are the chief aids in making the differentiation.

Treatment.—The local treatment of psoriasis of the nails is by the use of ointments containing salicylic acid, ammoniated mercury, or tar. Radiotherapy is an excellent method when used cautiously. In

FIG. 297



Eczema of the nails. (MacKee.)

eczema soothing applications are required. An oily or other lotion, or the soothing ointments suggested in the treatment of eczema of the skin, should be kept applied constantly on dressings. In some cases more stimulating remedial agents may be necessary.

Internally, arsenic has occasionally been of value.

Other dermatoses in which the nails are secondarily affected, usually as complications only of the original process, are the several forms of pemphigus, dermatitis herpetiformis, epidermolysis bullosa hereditaria, pityriasis rubra pilaris, and pityriasis rubra. In most of these disorders the nail-changes (thickening, thinning, discoloration, subungual hemorrhage, loosening, and splitting) are resultants of the general disorder. In all type-cases of pityriasis rubra the nails are involved, being usually dislocated from the bed and often shed. In

the early stages of the disease, the changes in color and nutrition of the nails are well marked.

Generalized alopecia areata is frequently accompanied by nail-changes, including leukonychia, onychorrexia, and other atrophic and dystrophic changes.¹

SYPHILIS OF THE NAILS.²

The nail may be attacked by the initial lesion of syphilis, or be the seat of the later manifestations of the disease. Chancres of the finger are often seated in the nail-folds, partly in consequence of the frequency of hang-nails in that region, partly because of the exposures incidental to the use of the digits.

The chancre is usually single, and may occur as an indolent, indurated fissure, accompanied by the usual adenopathy in the epitrochlear region; or, beginning as a painless, indurated nodule, may develop into a circumscribed, dull-reddish, exuberant mass. The tumor-like projection usually ulcerates superficially. Occasionally, cases are observed where there is uninterrupted evolution of the lesion, as the surgeons, midwives, and others commonly infected have usually cauterized, excised, or otherwise treated the sore. Some of them suffer simultaneously from sepsis, and, aside from the accompanying epitrochlear and axillary adenopathy, develop febrile temperatures, have axillary abscesses, and suffer greatly in health before the syphilitic process is distinctly recognized.

In yet other cases a wide-margined, florid, and exuberantly granulating fungus mass springs from the nail-fold, capped with a sanguineous ulcer, the nature of which is long unsuspected. This induces parallel ridges in the nail-plate, or, by ulceration, may cause its exfoliation (White).

Syphilis of the Nail-plate (*Syphilonychia Sicca*, *Friable Onychia*, *Scabrities Unguium Syphilitica*. Fr., *Onyxis Syphilitique*).—In this condition the nail may be attacked in whole or in part, and in the latter event with definite contour of the involved area. The distal portion is commonly first involved, the horny plate losing its polish, becoming dull-reddish or yellowish-white in color, friable, cracked, thickened, roughened, and fissured. The nail-folds may be secondarily infiltrated and scaling. In some cases the nails are considerably thickened; in others pinhead-sized, necrotic, sharply defined points open to the matrix; the condition strongly resembling the similar change seen in psoriasis. Longitudinal striations may occur, such cases having been recorded by Heller³ and Adamson.⁴ One or several of the plates may

¹ Sequeira, Brit. Jour. Derm., 1912, xxiv, p. 122.

² White, C. J., Boston Med. and Surg. Jour., 1902, cxlvii, No. 20, p. 537; Adamson, Brit. Jour. Derm., 1910, xxii, p. 53; and Adamson and McDonagh, *ibid.*, 1911, xxiii, p. 68 (a good description of the dry forms of onychia syphilitica).

³ Zeitschrift, 1909, xvi, Heft. 1, p. 31; abstr. Brit. Jour. Derm., 1909, xxi, p. 130 (*Striæ longitudinales medianæ unguium syphiliticæ*).

⁴ Loc. cit.

be shed in a painless process, though prompt amelioration may occur under treatment.

Pigmentation of the nails in secondary syphilis, occurring as black spots in the lunule, progressively increasing and developing coincidently with the generalized specific exanthem, though not even or uniform in deposit, is described by Vorner.¹

Syphilis of the Nail-Bed and Matrix (*Paronychia Syphilitica Ulcerosa*).—The paronychia due to syphilis is the more frequent of the nail-symptoms of that disease, and may first attack the nail-wall or fold, which then becomes dull-reddish in hue, infiltrated, and scaling. After persistence the plate begins to show the changes seen when the

FIG. 298



Onychia and paronychia occurring in conjunction with a generalized pustular syphiloderm.

latter is primarily attacked. The process is indolent, though under appropriate therapy it may terminate before ulceration sets in.

In other cases a papule, pustule, or an infiltrated and indurated nail-wall breaks down with ulcer-formation, attacking the border of the nail and extending beneath the plate, which undergoes the secondary changes already described. In severe cases the nail, after turning a greenish-black hue, is dislocated to one side or shed, and the entire matrix becomes the seat of an extensive and spreading ulcer. The phalanx becomes swollen, clubbed, and painful; and abortive attempts at new nail-formation may be recognized. Taylor describes a rapid necrosis, beginning with a brilliant, diffuse redness

¹ Münch. med. Wochenschr., December 10, 1907; abstr. Jour. Cut. Dis., 1908, xxvi, p. 437.

of the entire phalanx, in which the nails are destroyed "as if struck by a blight," resulting in grave ulceration, with lymphangitis and adenopathy. The entire forearm becomes reddened and swollen, due to a sequestrum of the embedded portion of the dead nail.

In congenital lues the nails are less often affected than in the acquired forms of the disease. In both the process may assume the onychia type. In the former the resulting onychia is often a part of a specific dactylitis, the earliest lesion being a papulo-pustule at the margin of the nail, which bursts and leaves an ulcer extending to the matrix and surrounding soft parts. The phalanx on which the nail is implanted is the seat of a painful osteitis, becomes club-shaped, and the ulcer, when fully formed, presents the characteristics of specific tissue-loss in general, with everted edges, sloughy floor, and indolent infiltration of the skin in the vicinity. In other cases a chronic inflammatory process affects the soft parts about the nail, and the plate undergoes consequent changes, losing its polish and becoming dirty-yellowish in hue, thickened, friable, and furrowed.

In Vajda's case, cited by Shoemaker, a speckled appearance of the nail first appeared, due to splitting of the young nail-substance into undulating lamellæ, with a corresponding "wavy arrangement of the nail-cells." There was enormous, massive thickening of the nail, associated with hypertrophy of the papillæ of the bed.

Treatment. — Energetic treatment of the systemic condition is required in all luetic diseases of the nails. The special mode of such treatment depends, as a rule, upon the time which has elapsed since infection; but the existence of a well-marked nail-lesion of undoubted syphilitic character always points to the urgent need of remedies directed to the correction of the toxic disorder. As a rule, most of the diseases of the nail due to syphilis are both chronic in course and rebellious under even energetic remedies.

In most of the dry and non-ulcerative affections, shampooing of the nails should be practised daily. When scraping or filing of the nails is required for the purpose of removing crumbling tissue, a previous soaking in a 50 per cent. aqueous solution of potassium hydroxid may be required. At night a pomade should be applied, containing mercurial ointment, 1 part to 2 or 3 of lanolin oil, kept in place by a cot. For this may be substituted ammoniated mercury, 1 part to 15 or 30 of cold-cream salve. The sulphur salves in 10 per cent. strength, with the red sulphid of mercury added in the strength of 10 decigrammes to 30 of salve basis, are often efficient.

In ulcerating nail-disorders the treatment of the attacked parts is very largely that of ulcerations elsewhere. The strong caustics once advocated are now much less frequently applied. Soaking in bichlorid of mercury solutions, 1 to 1000, is preferable; and when granulations are present pencillings with a 10 to 15 per cent. solution of argyrol or silver nitrate. Plaster-mulls of hydrargyrum serve a useful purpose, especially in the dry forms; but may be used also in the others by thoroughly cleansing the area each time before their application.

ONYCHOMYCOSIS.¹

The diseases of the nails due to invasion by vegetable parasites are much less frequent than cutaneous affections of similar origin. It is, however, accepted that this group of diseases is much more common than is generally believed. A single nail of the hand or foot (occasionally several) has exhibited morbid symptoms year after year before the exact nature of the change was recognized. It is undetermined whether ringworm or favus of the nails is more common in this country.

Trichophytosis Unguium (*Tinea Trichophytina Unguis*, *Ringworm of the Nails*. Fr., *Onychomycose*; Ger., *Schimmelpilzmykose der Nägel*).—Ringworm of the nails is an affection of great rarity. It was formerly thought that the trichophyton ectothrix was the most common cause of the affection, but recent cultural experiments reveal the endothrix most frequently, especially in England and Scotland.² Whitfield, reporting Low's findings, states that in three cases he obtained an endothrix and in one an ectothrix, and further states that an endothrix was demonstrated by Pernet³ and Sequeira.⁴

There may be coincident ringworm of the body,⁵ and the parasite may attack one nail only or several or all.⁶ After invasion of the nail, the plate becomes changed in color, consistency, and shape, the process beginning commonly in the anterior border of the lateral fold. After infection of the nail-bed and matrix, the nail becomes friable and breaks away irregularly from its attachment; there is often subungual débris of cells; and the hyphomycetic invasion extends in longitudinal striæ toward the lunula. As usually seen, the nail surface is irregular, showing ridges and depressions; is spongy, granular, and of a yellowish or brownish hue. The anterior portion of the plate is finally cast, leaving a stump near the lunula. Marked deformity of the plate is thus induced.

Onychomycosis Favosa (*Tinea favosa unguium*, *Favus of the nails*. Fr., *Onychomycose favique*, *Favus des ongles*).—In favus of the nails the effective parasite is the achorion of Schoenlein, usually implanted on the nails by autoinfection from scutella.

The nail-changes in favus closely resemble those described in ringworm. The nails become yellowish, brownish, or blackish in hue, and are traversed by ridges and furrows. Subungual masses of cells form, though no true scutella; a dirty-whitish, dry powder, containing scales, forming both beneath the free border and beneath the attached plate, raises the latter from its bed. The nail may present a honeycombed appearance, and later disintegrate and largely disappear.

¹ Grindon, Trans. Amer. Derm. Assoc., 1901, p. 111.

² Low, Edinborough Med. Jour., 1911; abstr. Brit. Jour. Derm., 1911, xxiii, p. 86 (in seven out of eight successful cultures the endothrix fungus was found).

³ Brit. Jour. Derm., 1901, xiii, p. 476.

⁴ Ibid., 1906, xviii, p. 269.

⁵ Ravogli, Jour. Amer. Med. Assoc., July 27, 1907, p. 308 (with four illustrations).

⁶ Lancashire, Brit. Jour. Derm., 1912, xxiv, p. 286 (all nails of hands and feet involved; contracted from cattle).

Diagnosis.—The diagnosis of both ringworm and favus must be confirmed with the microscope. Greater difficulty is experienced in

FIG. 299

*Tinea trichophytina unguis.* (Howard Fox.)

demonstrating the fungus in the nail than in scrapings from the skin, but by allowing more time for the potassium hydroxid to dissolve

FIG. 300

*Trichophytosis unguium.*

the nail-cells it can usually be successfully accomplished. When the disease is present on the skin or in the scalp, the diagnosis is more readily made.

Treatment.—In the treatment of both trichophytosis and favus of the nails, it is first necessary to remove as far as may be the horny substance, which interferes with the penetration of a parasiticide. The plate should be first scraped and then anointed with some substance having power of penetration, such as the mercuric oleates, 10 to 20 per cent. or stronger; bichlorid of mercury solutions; olive oil and pyrogallol, equal parts (Pellizzari, Dubreuilh);¹ solutions of iodine and iodid of potassium, 15 grains (1.) of the first to half a drachm (2.) of the second, dissolved in a litre (1000) of distilled water (Sabouraud).² Leistikow (quoted by Hardaway)³ advises:

Pyrogallol,	gr. xxiv;	1'5
Naphtol,	3ss;	2.
Hydrarg. ammon.,	gr. xv;	1'
Tinct. guaiaci.,	5 vijss;	30' M.

Harrison, after scraping the nail, applies on lint 1 part of the iodid of potassium to 4 each of liquor potassæ and distilled water, for fifteen minutes, after which a 1 per cent. solution of the bichlorid of mercury in equal parts of alcohol and water is kept in contact with the part for twenty-four hours. This method is advocated by Radcliffe-Crocker. Sulphurous acid from a freshly opened container, or an aqueous solution of the hyposulphite of sodium, 1 part to 6 or 10, mopped over the nail after application of dilute acetic acid, is often effective. Walker⁴ advises dressing the nails for two days with Fehling's solution on lint, covered with a finger-stall, then removing the softened nail and dressing it subsequently with a 2 per cent. solution of copper sulphate.

The disease in either case is persistent and difficult to eradicate.

CONGENITAL ABNORMALITIES AND DISEASES OF THE NAILS.

Diseases of the nails in this group, aside from onychia mentioned below, are occasionally exhibited in newborn infants. The most of these cases illustrate the changes described above under the titles Onychiauxis, Onychogryphosis, and Onychatrophy. At times one or more, rarely all, the nails of both hands and feet are defective in production of the horny substance of the nail; or the extremity of a bulbous and deformed digit may be capped with greatly enlarged nails; or with nail-plates forming upward-projecting, horny, peg-like structures; or a well-marked subungual keratosis may have been determined. The congenital affections of the integument most often concurrent are: ichthyosis of the "hystrix" type, epidermolysis bullosa hereditaria, and, very rarely, syphilis. With these anomalies may exist partial or total absence of hair from the scalp, brows, and other regions of the body, as also failure of eruption of the teeth.

¹ Monatshefte, 1896, xxii, p. 212.

² Trans. Amer. Derm. Assoc., 1901, p. 133.

³ Annales, 1896, vii, p. 33.

⁴ Quoted by Low, Loc. cit.

Anonychia.—Nail-plates may be wholly or partially absent in the newborn, even with normal development of phalanx, nail-bed, and nail-fold. Very rarely all the nails, more commonly one or several of those of the fingers or the toes, have been wanting. Cases of congenital anonychia are on record in which in after-life the nails did not develop. In other instances, nails existing at birth have soon afterward been shed, without further production of nail-growth. Again, the newborn suffering from intrauterine affections of the skin may exhibit a loss of nails due to such congenital disease, as in severe grades of ichthyosis (harlequin fetus), *variola in utero*. True congenital absence of the nails is extremely rare. Heidingsfeld,¹ in reporting an example, found few others in the literature.²

Polydactyly and Syndactyly.—Supernumerary fingers and toes commonly have properly adjusted nails. In some such anomalies, however, the nails have been wanting; in yet others double nails have existed on the supernumerary digit; and in still other cases claw-like nails have developed.

Onych-heteropia.—In the rare cases where rudimentary fingers and toes have been implanted elsewhere than upon the hands and feet, nails have been produced in anomalous situations.

DISEASES OF THE MUCOUS MEMBRANES IN PROXIMITY TO THE SKIN.

COINCIDENT involvement of the mucous membranes and the skin occurs in a number of diseases, such as lichen planus, erythema multiforme, pemphigus, and many others, their characteristics having been outlined in connection with the general description of the disease. In this chapter a few independent disorders not infrequently seen by the dermatologist are considered.

LEUCOKERATOSIS BUCCALIS.³

Synonyms.—Leucoplasia, Leucoma, Psoriasis Linguae, Smoker's Patches of the Mouth, Buccal Psoriasis, Ichthyosis Linguae, Tylosis Linguae, Leucoplakia Buccalis. Fr., Leucoplasie, Plaques Blanches de la Bouche.

In the year 1868 Bazin described with accuracy the several conditions indicated by the names given above; and since that date the subject has been enriched by a literature contributed to by Debove, Kaposi, Sigmund, Plumbe, Mauriac, Schwimmer, Ingals, and others.

¹ Trans. XVII Internat. Congress of Med., London, 1913, Sect. 13, Part 2, p. 93.

² Bergé and Weissenbach, *Annales*, 1912, p. 244; abstr. *Jour. Cut. Dis.*, 1913, xxv, p. 603 (complete congenital absence of nails of all fingers).

³ For bibliography, see Bénard, *La Pratique Derm.*, ii, p. 969; and Butlin and Spencer, *Diseases of the Tongue*, London, 1900.

Symptoms.—The disease as manifested in the mouth, is characterized at the outset for some weeks or months by special sensitiveness to irritation produced by ingesta; later, by the occurrence on the inner faces of the lips and cheeks, and on the dorsum and edges of the tongue, of sharply outlined, dull-whitish, slate-colored, or silver-white points, disks, streaks, bands, ribbons, or patches of an irregular shape, either flattened or slightly elevated above the general level of the mucous surface. The aspect of the lesions often suggests that they have been lightly penciled with the nitrate of silver. The disease may occur in isolated points or in pinhead-sized nodules, discrete or confluent, and in cases grouped, the grouping being often in linear arrangements following the lines indicated by the streaks or the striæ of similar composition. According to Butlin, the smoker's patch occurs most frequently near the centre of the tongue and begins as a smooth, erythematous spot, or the early change may be a bluish-white or pearly area.

The sites of election of the lesions are: the inner face of the cheek in a line following that traced by the conjunction of the teeth of the upper and lower jaw when approximated; the gums above the upper canine teeth and lateral incisors; the sulcus beside the upper and lower gums in the roof and floor of the mouth; the dorsum and edges of the tongue, where the arrangement is usually in lines along the longitudinal axis.

When closely examined these lesions are found to be made up of a hyperkeratinized epithelium, being covered by an adherent and more or less dense pellicle, removable only by artificial measures and closely applied to the inferior stratum of the mucosa. The lesions are rough to the touch, both to the finger of the physician and to the tongue of the subject of the disease, but are, as a rule, not tender, though at times annoying by producing a certain degree of stiffness and immobility of the parts affected. At times the membrane in the vicinity is reddened and tender. In other cases projecting, thick, rough nodules develop, or a dense, well-defined, elevated plaque.

These lesions are extremely chronic of evolution, requiring months and often years for their full development, and resisting in a remarkable way the action of topical medicaments. They may be removed without recurrence; or may recur after complete and radical ablation. If unmolested and not undergoing resolution (a course somewhat doubtful of occurrence), they usually, by reason of increased density, crack or fissure at one or another point, the fissure extending to the derma and arousing a local inflammatory process, with the production of pain and distress. The surface is then prone to exfoliate and ulcerate, and epithelioma of the mouth may result.

The proportion of the benign cases to those which result in epithelioma is not determined. Every leucokeratosis, however, may prove the initial stage of epithelioma, and the treatment of the former is, therefore a matter of no little consequence. Leucokeratosis is prone to develop fissures, and in cases where the patches are thickened or

verrucous epithelioma often results. The cases which develop in syphilis cannot be distinguished clinically from others. They are classified by Fournier as parasyphilitic lesions, and are rebellious to treatment.

More rarely, other parts, such as the vaginal and other mucous membranes, have been involved.¹

Etiology.—The cause of these cases is suggested by some of the names given above. The disorder occurs almost exclusively in the mouths of men, and usually after middle life. A typical and rather extensive case in a woman has been under the observation of the author. Unquestionably, the irritation produced by tobacco, whether used in smoking or chewing, and the influence of carious teeth, or those with sharp edges after fracture, irritating the edge of the tongue, are all important. We have seen a large patch of verrucous leucoplakia occupying the exact region between the cheek and teeth in which a piece of chewing tobacco had rested nightly for twenty years. We have, however, observed typical lesions in the mouths of men who had never contracted syphilis nor used tobacco. The resemblance of these lesions to the mucous patches of syphilis is obvious; and it is believed that syphilis, when not actively efficient in the production of leucokeratosis buccalis, may be one of its indirect causes. It is, however, important to note that all symptoms here described occur in persons who have never suffered from syphilis; and such symptoms are in the latter class as intractable as in others.

Pathology.—Butlin states that the processes going on are a proliferation of the cells of the rete Malpighii, with cellular infiltration in the papillary layer of the corium; a gradual shrinking and disappearance of the papillæ; and the formation of some scar-like tissue immediately beneath the epidermis. It is not definitely known whether the primary change is a pure hyperkeratinization of the epithelium or an inflammatory process of the papillary layer. The horny layer is hypertrophied, the cells retaining their nuclei. Leloir insists that the epitheliomatous process always begins, not at the level of the hyperkeratosis of the mucous membrane, but below the fissure or other lesion induced by the induration of the plaque or streak; indicating, in other words, that the epitheliomatous change is rather an accident than an essential part of the process.

Diagnosis.—The diagnosis is chiefly from syphilitic lesions of the mouth, which should be recognized, as a rule, by their softness and tendency to ulcerate, as well as by their situation, which is far less distinctive than in the case of leucokeratosis of the mouth. A history of infection and of symptoms of the disease in other regions of the body will usually indicate the nature of the process.

¹ Pflanz, *Zeitschrift*, November, 1899, xvi, p. 710; abstr. *Brit. Jour. Derm.*, 1910 xxii, p. 205: On leucoplakia of the mucous membranes, with special reference to leucoplakia of the genital region. Bohac, *Archiv*, Bd. cv, Heft. 1 and 2, p. 179; abstr. *Brit. Jour. Derm.*, 1911, xxiii, p. 126: Leucoplakia and kraurosis of the mucous membrane and skin.

Another malady likely to be confounded with leucokeratosis of the mouth is lichen planus; and it is important to note that some confusion exists on this point in several descriptions of the two diseases.

In lichen planus of the mouth there may be recognized over the tongue, the palate, and other parts, dense, smooth or fissured plaques, rings, festoons, linear striæ, or disks, covered by a silver-white pellicle. It is clear that the distinction between these and leucokeratotic lesions is in a high degree obscure. The presence of the lesions of lichen planus upon the cutaneous surfaces of the body would make the differentiation.

Treatment.—The treatment of leucokeratosis of the mouth is first by abstention from all local irritants (tobacco; highly spiced, heated, acetous, and iced articles of food and drink); by the care of the teeth; and by the employment of soothing sprays or lotions containing potassium chlorate, boric acid, balsam of Peru, iodized phenol, myrrh, or chlorid of iron.

Silver nitrate may be applied to any ulcerated or fissured points, both in solution and by sweeping the solid crayon over the surface. The French make use of the salicylates in the same way.

Destruction or removal of the lesions may be secured by the employment of caustics, chemical or galvano-cauteric; by erosion with a curette; or by surgical ablation. When practicable, the burr of the dental engine may be used, after injection of cocain hydrochlorid. Where the patches are not too dense and extensive, this has generally been productive of good results. Vidal employed a 20 per cent. solution of chromic acid.

Sherwell¹ reports complete removal of the patches by the use of undiluted liquor hydrargyri nitratis. The mouth is stuffed with cotton to protect adjacent parts and the solution is applied and allowed to remain from fifteen to twenty minutes, after which it is neutralized with sodium bicarbonate. If necessary, the application may be repeated two or three times, at intervals.

Pierce was successful in one case after rubbing into the patches pyoktanin blue, followed immediately with an aqueous solution of anilin oil. The applications were made daily for three months. In selected cases x-rays and carbon-dioxid snow may be employed.

For leucokeratosis of the vulvo-anal region complete excision has given the best results.

Prognosis.—The prognosis is fairly favorable in the case of all subjects of the disease who consent to deny themselves absolutely the luxury of tobacco in every form, and who can follow a prescribed hygienic and medicinal course. For all others there is more danger of epithelioma.

¹Jour. Cut. Dis., 1899, xvii, p. 185.

GROOVED TONGUE.¹

Synonyms.—Furrowed Tongue, Wrinkled Tongue, Sulcated Tongue, Scrotal Tongue, Ribbed Tongue, Fluted Tongue.

In this disease the tongue may assume the characteristics suggested by the above titles as the result of a superficial glossitis, or occur as a congenital or family disease. In certain cases a furrowed tongue indicates a slight stage of macroglossia, the tongue being too large for the mouth. Fine furrows occur on the dorsal aspect of the tongue in many persons. The major portion of people have such a furrow extending along the median line of the tongue. This in inflammatory conditions more readily becomes the seat of excoriation and ulceration, and is obstinate to treatment, on account of the constant contact of the sides of the furrow. Natural furrows also occur on other parts of the tongue, usually running in a longitudinal direction; they may, however, be curved or forked. Following inflammatory and other conditions, numerous furrows may be seen running over the surface of the tongue in all directions, producing a lobulated and grooved condition, and occasionally becoming so numerous as to present the appearance of a network. Particles of food accumulate in these situations and by undergoing decomposition produce irritant effects.

The disorder may be the result of syphilis, inherited or acquired, the latter producing a glossitis, which is followed by the furrowing. Smoking, drinking, and the friction of carious teeth are also predisposing causes of the condition. In older patients gout is given as a factor.

As a rule, there being no subjective symptoms and no sequelæ, treatment is not required. The tongue, however, should be kept clean, the individual depressions swabbed, and particles of food should not be allowed to accumulate. Mild alkaline and antiseptic mouth-washes may be employed. As the condition is a deformity, it cannot be overcome.

TRANSITORY BENIGN PLAQUES OF THE TONGUE.²

Synonyms.—Glossitis Areata Exfoliativa, Pityriasis Linguae, Annulus Migrans, Exfoliatio Areata Linguae, Erythema Migrans, Wandering Rash, Circinate Eruption of the Tongue. Fr., Desquamation aberrante en aires de la langue, Erythème ambulant; Ger., Zungenfratt.

Wandering rash is an uncommon disease, and, though essentially a children's disease, has been occasionally observed in adults. Both

¹ Butlin and Spencer, Diseases of the Tongue, 1900.

² LITERATURE: Moeller, Deutsche klinik, 1851, No. 26, p. 273. Parot, Progrès méd., 1881. Caspary, Vierteljahr., 1880, p. 183. Colcott Fox, Lancet, 1884, p. 842. Kinnear, Jour. Cut. Dis., 1887, v, p. 56. Böhm, Volkm. Sammlung klin. Vorträge, 1899, p. 24. Butlin and Spencer, Dis. of the Tongue, 1900, p. 94 (to this article the author is much indebted). Klausner, Archiv, ciii bd., 1 heft, p. 103 (extensive literature).

PLATE XXXIX



**Congenital Hypertrophy of
Tongue.**



Leucoplakia of Tongue.



**Leucoplastic Striæ of
Tongue.**



**Epitheliomatous Trans-
formation of Leucoplastic
Lesions of Tongue.**

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sexes are equally liable to its attack. The disease consists of one or more patches on the dorsum of the tongue, which in the early stages are pea-sized and smooth, red, and on the same level as the surrounding surface of the tongue, although they may appear slightly depressed or slightly elevated, according to the condition of the tongue and the thickness of the fur. The filiform papillæ have been shed, but the fungiform papillæ may remain and even appear more prominent. The patch soon spreads and becomes a ring, either circular or oval. Its centre is smooth and redder than the normal mucous membrane, the redness increasing toward the border of the ring. The border is faintly or decidedly yellow in tint, and has been described as being a golden-yellow. It is slightly raised and sharply outlined. The patches almost invariably form on the dorsum or border of the

FIG. 301



Glossitis exfoliativa.

tongue, and are more commonly observed toward the tip, though they may affect any portion of the dorsum in front of the circumvallate papillæ. They present no evidences of surrounding inflammation. Occasionally, they may extend over the dorsum to the under aspect of the tongue near the tip.

The evolution of the lesion is described by Butlin as follows: "If one of the patches or rings is watched, it is observed to grow larger, until, widening out, it reaches the border of the tongue; then, losing its circular or ring shape, it forms a segment of a circle, the other segment of which may be found on the under surface. Several rings on the same half of the dorsum, by peripheral extension, intersect each other, but the intersection is not complete, for where they come in contact the border of one of them ends abruptly, while the border

of the other continues to advance unbroken. The meeting of the rings and the peculiar marking of the dorsum of the tongue which is produced by it led to the name 'geographical tongue.' As the circles widen out, so they may contract again, until each and every circle may disappear from the surface of the tongue. The disappearance may be so rapid that for a time the surface is redder and smoother than normal. Again, as the circles enlarge, fresh patches may form in their interior and by their peripheral extension form rings within rings, and fresh rings may form in areas from which the former rings have recently disappeared. In all these changes the circles preserve their original character of smooth, red centres and slightly raised, whiter or yellowish borders. The regularity of the outline of each ring is not always strictly maintained, but may be crenate and present projections here and there."

The disorder produces no subjective symptoms, as a rule. Occasionally, itching is complained of, which in some cases has been severe. Increase in the flow of saliva is also exceptional.

The disease has been believed to be parasitic in origin, but no parasite has been discovered. It has also been attributed to syphilis. Fournier classes some of the cases in the parasymphilitic category. The disorder does not respond to antisymphilitic treatment. Debility appears to be either a predisposing or exciting cause. Many cases have been seen in delicate children. The histology as described by Parrot showed tumefaction of the epithelium at the level of the patches, with thickening of the rete Malpighii, and enlargement of the cells of the stratum corneum. In the papillary and subpapillary layers of the corium a perivascular and cellular infiltration of lymphoid cells occurs. It is therefore seen to be a subacute inflammatory process of the mucous membrane of the tongue.

The disease is obstinate, and its course is marked by exacerbations and partial recovery. The life of each ring is short, only lasting six or seven days, but the entire process may be prolonged. Its differentiation from mucous patches of syphilis and leucoplakia is readily seen.

Treatment.—The treatment consists in the constitutional remedies indicated in the individual cases. Locally, astringent lotions containing tannin, alum, sulphate of zinc and chlorid of zinc, or soothing lotions containing borax, potassium chlorate or chromic acid, are recommended at various times. All local irritants should be interdicted.

THE HAIRY BLACK TONGUE.¹

Synonyms.—Lingua Nigra, Hyperkeratosis Linguae. Fr., Langue noire, Langue noire pileuse, Negritie de la Langue; Ger., Schwarze Haarzunge.

¹ For review of the literature, see Heidingsfeld, Jour. Amer. Med. Assoc., 1910, lv. p. 2117 (description of two cases, with histological study); and Butlin and Spencer, Diseases of the Tongue, 1900, p. 145.

Hairy tongue is produced by an overgrowth of the epidermis of the filiform papillæ, which gives the clinical appearance of hairs. These epithelial filaments may become from one-fourth to one-half of an inch in length. The color is often black, but it may be a sepia-brown, yellow, or even blue. The black patch occurs most frequently in the middle of the dorsum of the tongue, in front of the "V" formed by the circumvallate papillæ; less frequently behind this area or near the end of the tongue. The lesion is darkest in the centre and fades toward the edge of the patch, where it may be a light-brown. As a rule, the discolored area is at first of small size, but extends slowly until it covers a large portion of the dorsum of the tongue, and it may persist for a few weeks up to many months. Disappearance is by a gradual desquamation of the epithelium, the color fading to a brownish-yellow at the border. Recurrences may happen. In exceptional cases, the discoloration is all that has been noticed, but as a rule the papillæ are enlarged and elongated. There seems to be no connection between the discoloration and the overgrowth of the papillæ, the former being due, apparently, to the various microorganisms.

The appearance of the tongue has been compared in different cases to various objects. In one the surface area was described as "like a field of corn laid by the wind and rain." In another the elongation of the papillæ was likened to feathers with a central stem and lateral webs. The cause of the disease is not known. Heidingsfeld believes that there are two forms, a true and a false. The former he ascribes to some anomaly of development, probably of congenital origin.

As above stated, the question of color is distinct from the origin of the hyperkeratosis. As a rule, no subjective symptoms are present. Slight pain and a mawkish taste have been described after the attention of the patient has been attracted to the presence of the disorder.

The duration of the disease is variable, but it ultimately tends to spontaneous disappearance, and in no case is followed by sequels. Treatment has been unsatisfactory. After shaving or scraping, the patch recurs, but later disappears of its own accord. If necessary, a 2 per cent. solution of salicylic acid may be applied, or a weak solution of phenol rubbed in three or four times daily. Lactic acid has also been employed.

CHEILITIS GLANDULARIS.

Synonyms.—Cheilitis Glandularis Apostematosa (Volkman), Myxadenitis Labialis.

This disorder was described by Volkmann¹ in 1870, after observation in five cases. The disease occurs chiefly on the lower lip, which becomes swollen, tumid, and tense, and is studded with pinpoint- to hemp-seed-sized elevations representing muciparous glands with dilated follicular orifices, often admitting for some distance a fine

¹ Virchow's Archives, 1870, i, p. 142.

probe, from which exudes a thin mucoid or muco-purulent fluid, and at times a thin, clear serum. Purdon¹ observed four examples presenting practically the same features. In his cases there appeared to be an active catarrhal condition of the lining membrane of the cheeks and gums. A rather severe catarrhal inflammation of the mouth and throat occurred in the cases described by Sutton,² Howard Fox,³ Schamberg,⁴ and Wise.⁵ The enlarged mucous glands of the lip may be felt with the finger as nodules beneath the mucous membrane. Not infrequently the lips are glued together in the morning by the drying of the mucoid substance.

Etiology and Pathology.—The cause of the disorder is not known. Volkmann believed it to be due to a catarrhal inflammation of the glands of the lip. It has been suggested that the inflammation of the pharyngeal and buccal mucosa is responsible for the disorder occurring in the lip. Sutton,⁶ in a histological study, found the greatest changes in the ducts of the mucous glands; the corium was altered but little. He concludes that there is an adenomatous condition of the mucous glands of the lip, characterized by enormous dilatation and hypertrophy of the ducts, usually accompanied by a great increase in the amount of glandular tissue (probably congenital in origin) and subsequent degenerative changes and increase of elastic fibers in the surrounding derma.

Prognosis and Treatment.—In three of Volkmann's cases relief was obtained with potassium iodid after one or two months' administration. Local applications of various sorts have been tried without much benefit. In one of Sutton's cases x-rays proved of value.

CHEILITIS EXFOLIATIVA.

Synonym.—Persistent Exfoliation of the Lips (Stelwagon).

Cheilitis exfoliativa is an inflammatory disease of the mucous membrane of the lips, which appears to be closely related to, if not identical with, dermatitis seborrhoica. Several of the earlier reported cases were recorded under different titles,⁷ but have been collected by more recent observers. Under the title given above cases have been recorded by a number of observers.⁸

The disorder is characterized by the formation of scales and crusts limited to the vermilion of the lips. In Stelwagon's and in some other cases a slight seborrhea of the scalp was associated. Some cases

¹ Brit. Jour. Derm., 1893, v, p. 23.

² Jour. Cut. Dis., 1909, xxvii, p. 150 (a report of five cases and review of the literature).

³ Ibid. p. 229 (case presentation); *ibid.*, 1913, xxxi, p. 415 (case presentation).

⁴ Ibid., 1911, xxix, p. 449 (case presentation).

⁵ Ibid., p. 504 (case presentation).

⁶ Unna's Festschrift, 1910, i, p. 611.

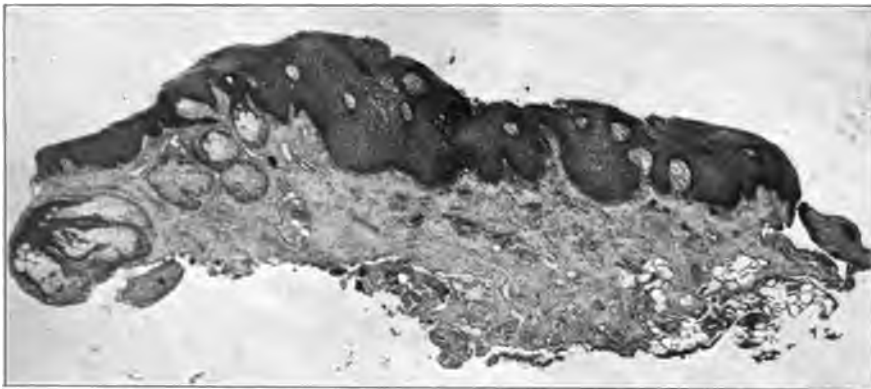
⁷ Galloway, Brit. Jour. Derm., 1895, vii, p. 113; Jamieson, Brit. Med. Jour., December 7, 1895, p. 1410; Stelwagon, Jour. Cut. Dis., 1900, xviii, p. 268, and *ibid.*, 1904, xxii, p. 351.

⁸ MacLeod, Brit. Jour. Derm., 1907, xix, p. 388; Ravitch, Jour. Cut. Dis., 1908, xxvi, p. 359; Little, Brit. Jour. Derm., 1909, xxi, p. 252; Davis, *ibid.*, 1911, xxiii, p. 149; Öcks, Jour. Cut. Dis., 1911, xxix, p. 244; Trimble, *ibid.*, 1913, xxxi, p. 584; Gaskill, *ibid.*, 1914, xxxii, p. 498.

exhibit a constant exfoliation of scales of varying thickness and size. In several cases quite marked crusting has been recorded, the crusts forming rapidly, exfoliating soon, and reforming again. Yellowish and darker crusts are described as occurring in heaped-up masses, projecting to the extent of a quarter of an inch or more, and covering the entire red portion of both lips. On removal of the crusts a reddened and slightly fissured surface is left, upon which a new crust rapidly forms. The lesions are likely to be picked and scratched, and moistening of the lips has been thought to be a factor in some cases. Tenderness and a moderate amount of pain, with burning sensations, have been described. The course of the disease is chronic. A neurotic element is frequently present. The major portion of patients have been women.

Treatment.—The disease is rebellious to treatment. Stelwagon recommends a sulphur ointment and a resorcin lotion. X-rays have been used successfully in the condition by Morris,¹ ourselves and others.

FIG. 302



Fordyce's disease. Low power. Showing on the left the sebaceous structures, lying for the most part under the epidermis, covered by torn skin. On the right appears the disease proper, consisting of a greatly hypertrophied epidermis. (C. J. White.)

FORDYCE'S DISEASE.

Synonym.—Pseudo-colloid of the Lips.

Definition.—This is a chronic disorder limited to the mucous membranes of the lips and oral cavity, characterized by discrete, yellowish or light-colored, milium-like lesions, unaccompanied by subjective sensations.

The first case was described by Fordyce² in 1896, at which time, and for a brief time after, it was thought to be rare, but subsequent observation has demonstrated that it is relatively common. It is more

¹ Dis. of the Skin, 1911, p. 618.

² Jour. Cut. Dis., 1896, xiv, p. 413 (A peculiar affection of the mucous membrane of the lips and oral cavity).

frequently detected on examination for other lesions, as patients rarely apply for its relief, owing to the absence of any subjective sensations.

Symptoms.—The lesions are situated most frequently on the upper lip, lower lip, and on the oral mucous membrane extending along the line of the teeth as far as the last molar. They may be few or abundant, at times forming a plaque or band by aggregation of individual lesions.

FIG. 303



Fordyce's disease. High power. Illustrating in detail the points described in Fig. 302. On the extreme left can be seen the granular and horny layers of the torn skin over the sebaceous glands. Adjoining this area can be seen the parakeratotic process beginning. Farther toward the right can be seen the hypertrophied epidermis; the somewhat abnormal palisade layer with its infiltrating cells; the edematous, poorly staining rete-cells; the highly swollen reticulated cells; the superficial parakeratotic cells; and lastly, the widely dilated lymph-vessels and blood-vessels of the corium. (C. J. White.)

They vary in color from a yellowish hue on the lips to a whitish shade inside the mouth. They are primarily maculo-papules, and are best seen by putting the mucous membrane on the stretch.

Etiology and Pathology.—C. J. White,¹ in 70 per cent. of 65 cases, found these lesions in association with other disorders of the sebaceous

¹ Jour. Cut. Dis., 1905, xxiii, p. 97: Fordyce's Disease. (A review of the literature, with discussion and report of a clinical study of sixty-five cases, with histopathology of one case.)

glands, such as acne, rosacea, seborrhoic dermatitis, and alopecia furfuracea. The same proportion of these patients suffered from dyspepsia. The disease develops more frequently in males than in females, and most commonly between the ages of twenty and forty years, though it occurs both before and after these periods. Fordyce originally attributed the condition to a granular degeneration of the rete-cells. White confirmed this. Other observers found hypertrophy of the sebaceous glands a conspicuous feature.

Treatment is usually not required, and when instituted is of little avail.

Prognosis.—The disease is persistent, though benign in nature and productive of little discomfort or inconvenience. In neurotic individuals the lesions may be a source of anxiety until their benign nature is explained.¹

PERLÈCHE.²

Synonyms.—Labialitis, Bridou, Poissonnade, Niarde.

Definition.—Under this title, Lemaistre and others have described a disease of the lips recognized in infants and children. The disorder is contagious and transmitted either directly or by media brought in contact with the lips; for example, by the use of cups in common.

Symptoms.—In this disorder the labial commissures are symmetrically involved, the epithelium in the infected subjects being produced in excess, folded somewhat upon itself, and presenting a whitish or macerated aspect, as the result of which the mucous surface of the lip is readily denuded. Beginning at the commissure, the disorder may spread toward the centre of the lip, but it is said never to cover its entire surface. The disease not rarely spreads from the lips to parts in the vicinity, which in that event present the appearance of a whitish pellicle, projected and folded, passing from the corner of the lips outward.

Beneath the pellicle thus formed, the surface is somewhat reddened, and when irritated bleeds. The parts are rarely painful, though there is a moderate amount of itching, which leads the young subjects of the disorder to thrust the tongue from the mouth and in this way moisten the affected region. In a few cases the parts are painful, wide opening of the lips producing fissures of the commissures and some pain.

According to Jacquet, there is frequently an incidental coryza or diphtheroid stomatitis. In some cases the disease coexists with alopecia areata of dental origin. The disorder is short-lived, yielding

¹ Pringle, Brit. Jour. Derm., 1914, xxvi, p. 11.

² Lemaistre, Le Progrès Méd., November, 1884, 1885. Jaja, Giorn. ital., 1887. Morretti, Riv. Clin. d. Bologna, 1886. Raymond, Bull. de la Soc. de Derm. et de Syph., 1893, p. 289; Annales, 1893, iii, iv, p. 578. Planche, Thèse de Paris, 1897. Jacquet, Le Prat. Derm., 1902, iii, p. 839; Annales, 1902, s. iv, iii, p. 29. Beureau et Fortineau, Presse Méd., 1902; Gaz. Hebd. méd. et chir., October, 1901. Svestre and Gastou, Soc. des Hôp., 1891.

readily to proper treatment, but leaving in many cases for weeks a white, polished surface, which only slowly recovers its natural tint.

Diagnosis.—The recognition of the disease is facile, considering its location and its symmetry, its acute form, the absence of inflammation and of the symptoms of labial herpes and eczema. Care should be taken to avoid confusion with syphilis of the commissures of the lips.

Etiology and Pathology.—Lemaistre discovered a streptococcus, which he called *Streptococcus plicatilis*, isolated in some cases, and also found upon utensils employed by those who suffered from the disease. Raymond, Planche, and others, however, have recognized in these cases *Staphylococcus cereus albus* and *Staphylococcus aureus*. Sabouraud and Colcott Fox class the disease with local streptococcic infections. The disease is evidently one of uncleanness, propagated chiefly among children of the poor, and is best treated by such prophylaxis as is based upon proper hygiene.

Treatment.—Weak solutions of nitrate of silver, of the sulphate of copper, of alum, and of bichlorid of mercury are all efficient, care being taken that these medicaments are not swallowed by the child. Medicated tampons are sometimes required for local treatment of the fissures and angry commissures of the lips. Weak ammoniated mercury ointments are available when the patient is practically relieved by the other remedies named.

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